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Organization of the
United Nations

2

The future of food and agriculture

Alternative pathways to 2050

SUPPLEMENTARY MATERIAL

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Abbreviations

| | |
|--------------|---|
| BAU | Business as usual scenario |
| EAP | East Asia and the Pacific |
| ECA | Europe and Central Asia |
| FAO | Food and Agriculture Organization of the United Nations |
| GAEZ | FAO-IIASA Global Agro-Ecological Zones |
| GAPS | FAO Global Agriculture Perspectives System |
| GDP | Gross domestic product |
| GHG | Greenhouse gas |
| HIC | High-income countries |
| IIASA | International Institute for Applied Systems Analysis |
| LAC | Latin America and the Caribbean |
| LMIC | Low- and middle-income countries |
| NNA | Near East and North Africa |
| OECD | Organisation for Economic Co-operation and Development |
| PoU | Prevalence of Undernourishment |
| SAS | South Asia |
| SDG | Sustainable Development Goal |
| SSA | Sub-Saharan Africa |
| SSP | Shared socioeconomic pathways |
| SSS | Stratified societies scenario |
| TSS | Towards sustainability scenario |
| USD | United States dollar |

Introduction

The report “*The future of food and agriculture – Alternative pathways to 2050*” presents a foresight exercise led by the FAO Global Perspectives Studies Team and heavily relying on in-house expertise, skills and data, in addition to partnerships with external institutions. The aim of the report is to provide solid analytical ground and quantitative evidence for the identification and discussion of potential strategic options to move food and agricultural systems towards social, economic and environmental sustainability.¹

The overarching concern regarding the future of food and agriculture is whether these systems will be able to sustainably and effectively feed everyone by 2050 and beyond, while at the same time meeting additional demands for non-food uses of agricultural commodities.

Addressing the challenges of hunger, food insecurity and malnutrition in all its forms, features prominently in the targets of the second Sustainable Development Goal (SDG) of the 2030 Agenda for Sustainable Development. However, despite great progress in increasing income and wealth globally, billions of people still face pervasive poverty, hunger and malnutrition, different dimensions of inequality, joblessness, diseases and deprivation from vital goods and services. FAO’s most recent estimates indicate that 821 million people, approximately one out of every nine people in the world, were undernourished in 2017. Worse still, after a prolonged decline, both the absolute number and the prevalence of undernourishment (PoU) may have started increasing again, signalling a possible reversal of trends. At the same time, food insecurity is contributing to undernutrition, as well as overweight and obesity, and high rates of these forms of malnutrition coexist in many countries.

Additional concerns arise because much of humanity’s progress achieved so far has come at a considerable cost to the environment. To produce more food and other non-food agricultural goods, a combination of intensified agricultural production and the clearing of forests has led to the degradation of natural resources and is contributing to climate change. Should the development community continue to address these challenges with a “business as usual” approach, the future will not look promising. Sustainable food and agriculture systems cannot be achieved without significant additional efforts.

To address these concerns, the report analyses potential future scenarios that reflect, to varying degrees, the challenges to move food and agricultural systems towards social, economic and environmental sustainability. The first scenario is “business as usual”, whereby despite the efforts of many countries, several outstanding challenges facing food and agriculture are left unaddressed. The second scenario, “towards sustainability”, embodies proactive changes towards more sustainable food and agricultural systems. The third scenario, “stratified societies”, outlines a future with exacerbated inequalities across countries and throughout different layers of societies.

¹ In this report “agriculture” comprises all agricultural sectors including crops, livestock, fisheries and forestry.

The quantitative and qualitative analyses of the alternative scenarios provided in this report allow addressing fundamental questions regarding the future of food and agriculture, support the identification of strategic orientations that nurture national, regional and global dialogues and policy making processes and contribute to shape key messages for moving food and agricultural systems along sustainable patterns.

The evidence contained in this report, is based on solid qualitative assessments, and rigorous quantitative analysis. The reader is referred to the report or to its summary version for a description of the scenarios, the presentation of the methods applied to implement the foresight exercise, the analytical findings and the discussion of selected strategic options suggested to move food and agricultural systems towards sustainability.²

Quantitative analyses rely on both economy-wide and sector-specific simulation models. For each scenario at the regional and global level the results of the model-based exercise include separate and comparative analyses (across scenarios) of key variables and indicators, such as: the share of agricultural value added in the total economy; supply and demand for a set of food and agricultural products; long-term price trends; performances in food security and nutrition; natural resource use; net trade positions of the various regions for selected groups of products; and GHG emissions.

Given that the foresight exercise required and generated a very large amount of data, part of such data and related analysis is provided as supplementary material in this document. More specifically, this document provides the detailed analysis of selected commodity balances by region and scenario and related commodity balance tables, which complement information provided in the Section 4.6 “Commodity balances and net international trade” of the report. In addition this document provides statistical tables regarding historical and projected data by region, commodity or commodity group and scenario which complement, with more detail, selected sections and/or tables of the report. More specifically, the readers will find tables for projected yield shifters from technical progress and climate change, as a supplement to Table 3.7 of the report; gross agricultural output index, as a supplement to Table 4.1; historical dietary energy supply and projected dietary energy consumption, as a supplement to Table 4.2; per capita apparent consumption of proteins, as complementary information to the apparent per capita consumption of calories analysed in Section 4.5; projected harvested area, as supplement to Table 4.10; and historical and projected herd sizes, as a supplement to Table 4.11.³

² The FAO report “*The future of food and agriculture – Alternative pathways to 2050*” is available at www.fao.org/3/I8429EN/i8429en.pdf while all the other products can be found in the publication series webpage (available at www.fao.org/publications/fofa).

³ The full database at country level of the historical data and the projections to 2050 underlying the report is provided through the data publishing device available at www.fao.org/global-perspectives-studies/food-and-agriculture-projections-to-2050

1 | Commodity balances

Commodity balances are calculated as the difference between domestic production and domestic absorption and highlight whether a region or country is a net exporter or a net importer of a specific commodity. In other words, the balances define the “net-trade” position of a region or country. The ratio between domestic production and domestic absorption defines the self-sufficiency ratio. Particularly for food commodities such as cereals and meat, the self-sufficiency ratio has often been considered a strategic target variable, and thus heavily influences food and agricultural policies. Here below the commodity balances of cereals, meat, fruit and vegetables, dairy products, eggs, fish, oilseeds and cash crops are presented.

Cereals

■ **BAU:** Under the BAU scenario, compared with 2012, global cereal production is projected to increase by 54 percent in 2050. This increase in production is almost double in LMIC (excluding China, +77 percent) than in HIC (+36 percent). LMIC (excluding China) on average account for slightly less than half of global cereal production in 2012, while their share is getting close to 55 percent in 2050. This more than proportional growth in LMIC (excluding China) compared to HIC is led by expansion in SSA (+190 percent by 2050), followed by LAC (+ 115 percent by 2050) (see [Figure S 1.1](#) and [Table S 1.1](#)).

Worldwide, in 2012 almost 43 percent of cereal absorption was destined for food consumption. This percentage is projected to drop to 40 percent in 2050. Similarly in LMIC (excluding China), the share of food consumption in total absorption was close to 60 percent in 2012 and is projected to drop to 55 percent in 2050: first because per capita demand for food staple only slightly increases; and second because demand for animal feed increases at a higher pace compared to food demand.

The consumption of cereals for feed worldwide shifts from 35 percent of total consumption in 2012 to 41 percent in 2050. This is the result of opposite trends: in HIC, the share of feed remains almost stable throughout the simulation period and at around 50 percent of the total cereals consumption. In LMIC (excluding China) it grows from 25 to 34 percent and in China it grows from 38 to 54 percent from 2012 to 2050. This is due to increased consumption of meat and dairy food items.

Other uses of cereals – including feedstock for first generation biofuels – are expected to continue to account for nearly 20 percent of global production throughout the simulation period.¹

¹ Projections on feedstock biofuel are consistent with the medium-term projections in OECD-FAO (2017), and assume that capacities for first generation biofuels will continue being used beyond the medium term and will hence result in a steady demand for biofuel feedstock. Any further increase in biofuels is assumed to come from second-generation or more advanced technologies to produce biofuels.

Domestic absorption is expected to increase more than domestic production in LMIC excluding China, so that the self-sufficiency ratio for these countries in aggregate drops from 0.97 in 2012 to 0.93 in 2050. However, significant disparities exist within LMIC groups – while LAC dramatically increases its net exports, SAS and EAP (excluding China) and China keep their balance almost in equilibrium. The drop in the self-sufficiency ratio is particularly marked in SSA, where it shifts downward from 0.75 in 2012 to 0.60 in 2050; and in NNA, from 0.51 to 0.39 for the same periods (see [Table S 1.1](#)).

■ **TSS:** The TSS scenario projects an increase in global cereal production of 39 percent from 2012 to 2050, lower than the 54 percent growth projected in BAU. These differences are definitely more marked in HIC, ECA and China, while they are almost negligible in other EAP countries, SSA, and LAC. Thanks to the relative slowdown of HIC and China, by 2050 LMIC excluding China further increase their global predominance in cereal production compared with BAU.

In TSS, demand for cereals as food consumption evolves in a similar manner as under BAU, both in HIC, China and LMIC excluding China. Minor differences arise in HIC, which show a slight reduction in cereals as a contribution to the overall reduction in calorie consumption in HIC (see [Table 4.2](#) of the report) and a slight reduction in SSA due to higher income growth compared with BAU. This turns the consumption of some cereals such as millet or sorghum into necessities (goods for which demand decreases as income increases).

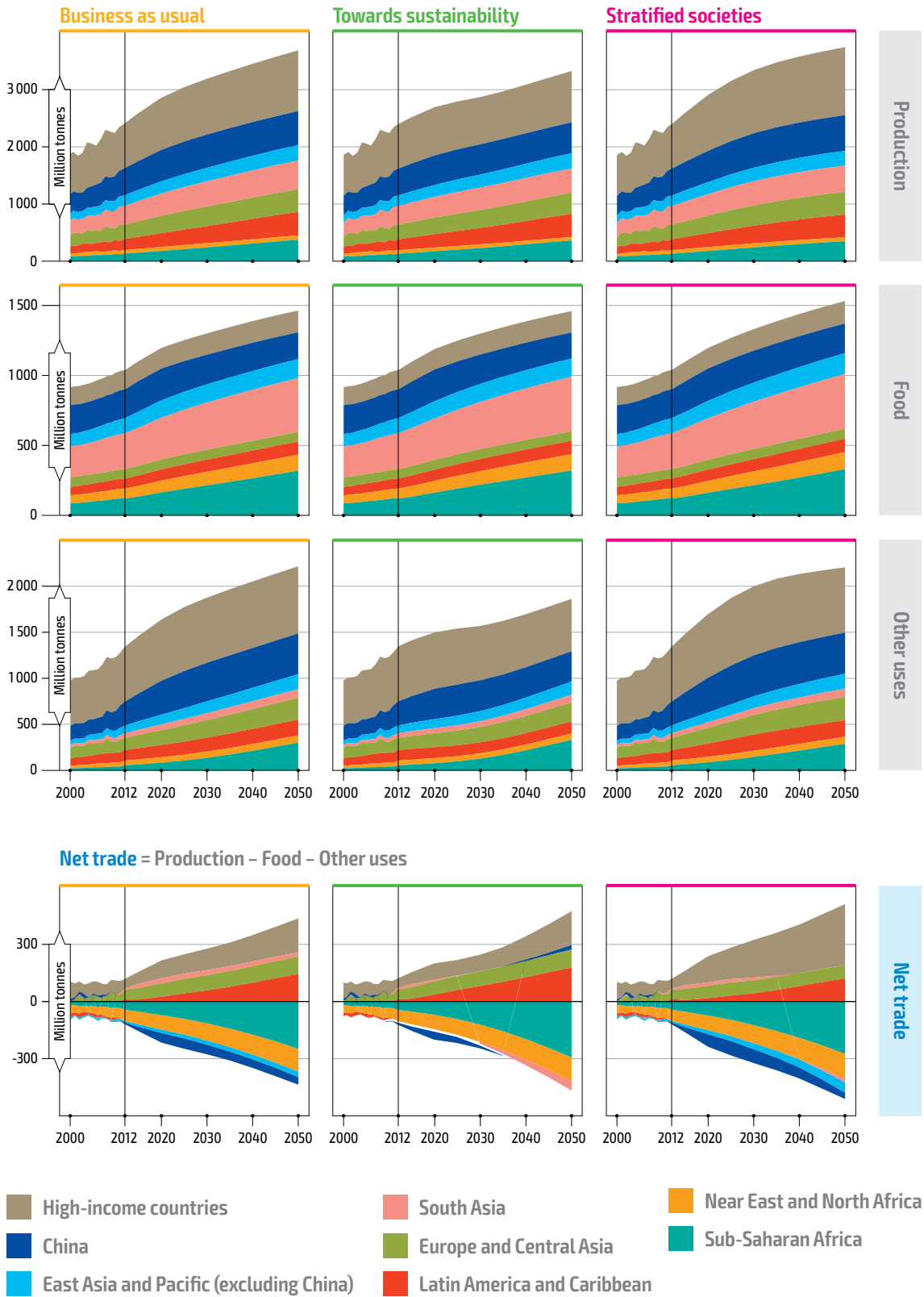
The slowdown in the growth of cereal production in TSS is largely motivated by lower expansion of demand for cereals as feed, which increases by less than 50 percent worldwide between 2012 and 2050 (over the same period in BAU it increases by 81 percent). This slowdown in cereal demand for feed is particularly marked in HIC: by 2050, it drops by 17 percent compared to 2012.

HIC increase their trade surplus so that their self-sufficiency ratio in 2050 shifts to 1.25 – compared to 1.20 under BAU – while volumes in absolute terms remain almost unchanged. LAC, thanks to a very limited increase of feed demand, significantly increase their already large self-sufficiency ratio compared to BAU. In China, the reduction of feed demand overtakes that of production, so that net exports rise slightly. Sub-Saharan Africa is projected to maintain almost the same level of growth in cereal production and a similar self-sufficiency ratio as under BAU (see [Table S 1.1](#)).

■ **SSS:** The SSS scenario, characterized by higher income growth than BAU in all regions except SSA, shows the highest global expansion of cereals of all the three scenarios. This expansion is fuelled by demand for cereals as food particularly in HIC, EAP, ECA and NNA (see [Table S 1.1](#)). A further spur to production comes from the almost unabated demand for feed compared to BAU everywhere, except in SSA, NNA and HIC.

As related crop yields evolve at a higher pace in HIC than in LMIC due to disparities in investment for equipment, technologies and infrastructure – as well as positive differentials in climate change impacts – production in HIC increases faster than in LMIC relative to BAU. HIC therefore consolidate their net trade position, as highlighted by the self-sufficiency ratio, which in 2050, under TSS shifts to 1.37, compared to 1.20 under BAU. Conversely, in LMIC excluding China, higher food demand combined with lower production growth, leads to more net imports (or decreased net exports in the case of ECA) and so to a decrease of self-sufficiency ratio, which in 2050 under TSS drops to 0.90, compared to 0.94 in BAU.

Figure S 1.1 Commodity balances for cereals by region and scenario



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: feed, seed, food losses, non-food processing (e.g. biofuels) and other demand. Positive (negative) net trade denotes net exports (imports). "Cereals" comprise: wheat, barley, maize, millet, sorghum, rice and other grains.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.1 Cereals: commodity balances by region and scenario

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|---|------------------------|----------------|------|------|------|------|------|------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Production | 781 | 975 | 827 | 1104 | 1064 | 897 | 1190 | 136 | 115 | 152 |
| | Food | 139 | 152 | 150 | 154 | 155 | 153 | 160 | 112 | 110 | 115 |
| | Feed | 361 | 433 | 324 | 475 | 447 | 298 | 424 | 124 | 83 | 117 |
| | Other uses | 230 | 276 | 265 | 277 | 284 | 269 | 285 | 123 | 117 | 124 |
| | Net trade | 50 | 113 | 88 | 198 | 178 | 177 | 320 | 354 | 351 | 636 |
| | Self-sufficiency ratio | 1.07 | 1.13 | 1.12 | 1.22 | 1.20 | 1.25 | 1.37 | 112 | 116 | 128 |
| East Asia and Pacific | Production | 655 | 818 | 757 | 837 | 865 | 807 | 884 | 132 | 123 | 135 |
| | Food | 314 | 342 | 338 | 365 | 327 | 316 | 360 | 104 | 101 | 115 |
| | Feed | 224 | 402 | 317 | 429 | 451 | 341 | 453 | 201 | 152 | 202 |
| | Other uses | 135 | 147 | 127 | 149 | 155 | 132 | 157 | 116 | 98 | 117 |
| | Net trade | -17 | -73 | -25 | -105 | -69 | 18 | -87 | 399 | - | 504 |
| | Self-sufficiency ratio | 0.97 | 0.92 | 0.97 | 0.89 | 0.93 | 1.02 | 0.91 | 95 | 105 | 93 |
| China | Production | 470 | 582 | 529 | 602 | 596 | 541 | 626 | 127 | 115 | 133 |
| | Food | 205 | 212 | 210 | 228 | 192 | 186 | 212 | 93 | 91 | 103 |
| | Feed | 180 | 323 | 250 | 348 | 343 | 244 | 345 | 190 | 136 | 192 |
| | Other uses | 94 | 98 | 85 | 100 | 101 | 85 | 102 | 108 | 91 | 109 |
| | Net trade | -9 | -51 | -15 | -73 | -39 | 25 | -33 | 431 | - | 363 |
| | Self-sufficiency ratio | 0.98 | 0.92 | 0.97 | 0.89 | 0.94 | 1.05 | 0.95 | 96 | 107 | 97 |
| East Asia and Pacific (excluding China) | Production | 185 | 236 | 228 | 235 | 269 | 266 | 257 | 145 | 144 | 139 |
| | Food | 108 | 130 | 128 | 136 | 135 | 130 | 148 | 125 | 120 | 137 |
| | Feed | 44 | 79 | 67 | 81 | 108 | 97 | 108 | 246 | 219 | 244 |
| | Other uses | 41 | 49 | 43 | 49 | 54 | 46 | 55 | 134 | 113 | 135 |
| | Net trade | -8 | -22 | -10 | -31 | -29 | -7 | -54 | 363 | 87 | 663 |
| | Self-sufficiency ratio | 0.96 | 0.92 | 0.96 | 0.88 | 0.90 | 0.97 | 0.83 | 94 | 102 | 86 |
| South Asia | Production | 327 | 439 | 392 | 425 | 502 | 426 | 459 | 154 | 131 | 141 |
| | Food | 257 | 337 | 338 | 338 | 385 | 390 | 391 | 150 | 152 | 152 |
| | Feed | 17 | 33 | 29 | 31 | 45 | 48 | 42 | 263 | 280 | 244 |
| | Other uses | 46 | 43 | 34 | 42 | 49 | 37 | 48 | 107 | 80 | 104 |
| | Net trade | 7 | 26 | -9 | 14 | 22 | -49 | -21 | 331 | - | - |
| | Self-sufficiency ratio | 1.02 | 1.06 | 0.98 | 1.03 | 1.05 | 0.90 | 0.96 | 103 | 88 | 94 |
| Europe and Central Asia | Production | 254 | 343 | 314 | 355 | 398 | 367 | 397 | 157 | 145 | 156 |
| | Food | 66 | 70 | 70 | 72 | 68 | 68 | 72 | 104 | 102 | 109 |
| | Feed | 86 | 135 | 116 | 154 | 172 | 148 | 188 | 200 | 172 | 218 |
| | Other uses | 49 | 58 | 51 | 60 | 66 | 57 | 67 | 133 | 116 | 136 |
| | Net trade | 53 | 80 | 77 | 68 | 92 | 94 | 70 | 174 | 179 | 134 |
| | Self-sufficiency ratio | 1.26 | 1.30 | 1.32 | 1.24 | 1.30 | 1.34 | 1.22 | 103 | 107 | 96 |

Table S.1.1 Cereals: commodity balances by region and scenario (continued)

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|--|------------------------|----------------|------|------|------|------|------|------|-------------------|------|------|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Production | 191 | 298 | 288 | 308 | 411 | 406 | 398 | 215 | 213 | 208 |
| | Food | 73 | 87 | 88 | 88 | 94 | 96 | 97 | 129 | 132 | 133 |
| | Feed | 84 | 114 | 89 | 136 | 130 | 100 | 137 | 155 | 119 | 164 |
| | Other uses | 25 | 38 | 30 | 41 | 42 | 32 | 43 | 169 | 128 | 171 |
| | Net trade | 10 | 59 | 81 | 43 | 144 | 179 | 121 | 1500 | 1857 | 1259 |
| | Self-sufficiency ratio | 1.05 | 1.24 | 1.39 | 1.16 | 1.54 | 1.78 | 1.44 | 146 | 169 | 137 |
| Near East and North Africa | Production | 62 | 74 | 64 | 72 | 75 | 59 | 69 | 121 | 96 | 112 |
| | Food | 72 | 97 | 97 | 99 | 115 | 116 | 121 | 160 | 162 | 169 |
| | Feed | 38 | 49 | 44 | 50 | 58 | 53 | 56 | 153 | 139 | 146 |
| | Other uses | 11 | 19 | 14 | 19 | 21 | 15 | 21 | 188 | 135 | 189 |
| | Net trade | -59 | -90 | -91 | -95 | -120 | -125 | -129 | 202 | 212 | 218 |
| | Self-sufficiency ratio | 0.51 | 0.45 | 0.41 | 0.43 | 0.39 | 0.32 | 0.35 | 75 | 63 | 68 |
| Sub-Saharan Africa | Production | 129 | 240 | 229 | 241 | 375 | 363 | 348 | 290 | 281 | 269 |
| | Food | 119 | 215 | 219 | 215 | 319 | 321 | 331 | 267 | 269 | 277 |
| | Feed | 26 | 84 | 82 | 94 | 212 | 248 | 204 | 827 | 967 | 795 |
| | Other uses | 27 | 55 | 49 | 55 | 92 | 88 | 88 | 336 | 320 | 323 |
| | Net trade | -43 | -115 | -120 | -124 | -248 | -293 | -275 | 577 | 682 | 638 |
| | Self-sufficiency ratio | 0.75 | 0.68 | 0.66 | 0.66 | 0.60 | 0.55 | 0.56 | 80 | 74 | 75 |
| Low- and middle-income countries | Production | 1619 | 2213 | 2044 | 2239 | 2625 | 2429 | 2555 | 162 | 150 | 158 |
| | Food | 900 | 1148 | 1149 | 1177 | 1308 | 1307 | 1371 | 145 | 145 | 152 |
| | Feed | 475 | 817 | 677 | 893 | 1069 | 938 | 1079 | 225 | 197 | 227 |
| | Other uses | 293 | 360 | 306 | 366 | 426 | 360 | 424 | 145 | 123 | 145 |
| | Net trade | -50 | -113 | -88 | -198 | -178 | -177 | -320 | 354 | 351 | 636 |
| | Self-sufficiency ratio | 0.97 | 0.95 | 0.96 | 0.92 | 0.94 | 0.93 | 0.89 | 97 | 96 | 92 |
| Low- and middle-income countries (excluding China) | Production | 1148 | 1630 | 1515 | 1636 | 2029 | 1888 | 1929 | 177 | 164 | 168 |
| | Food | 695 | 936 | 939 | 949 | 1117 | 1121 | 1159 | 161 | 161 | 167 |
| | Feed | 295 | 494 | 427 | 546 | 726 | 694 | 734 | 246 | 235 | 249 |
| | Other uses | 200 | 263 | 221 | 266 | 325 | 275 | 322 | 163 | 138 | 161 |
| | Net trade | -41 | -62 | -73 | -124 | -139 | -201 | -287 | 337 | 489 | 697 |
| | Self-sufficiency ratio | 0.97 | 0.96 | 0.95 | 0.93 | 0.94 | 0.90 | 0.87 | 97 | 94 | 90 |
| World | Production | 2399 | 3187 | 2871 | 3343 | 3689 | 3326 | 3745 | 154 | 139 | 156 |
| | Food | 1039 | 1301 | 1299 | 1331 | 1464 | 1460 | 1531 | 141 | 140 | 147 |
| | Feed | 837 | 1250 | 1000 | 1369 | 1516 | 1237 | 1504 | 181 | 148 | 180 |
| | Other uses | 523 | 636 | 571 | 643 | 710 | 630 | 709 | 136 | 120 | 136 |
| | Net trade | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 100 | 100 | 100 |

Notes: Net trade is calculated as domestic production – aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Cereals" comprise: wheat, barley, maize, millet, sorghum, other grains and rice. "Other uses" refers to the sum of non-food domestic uses, including: seed, food losses, non-food processing, biofuels and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Meat

In 2012, high-income countries accounted for 36 percent of the world's meat production. China was the second-largest supplier of meat worldwide (27 percent of global meat production).

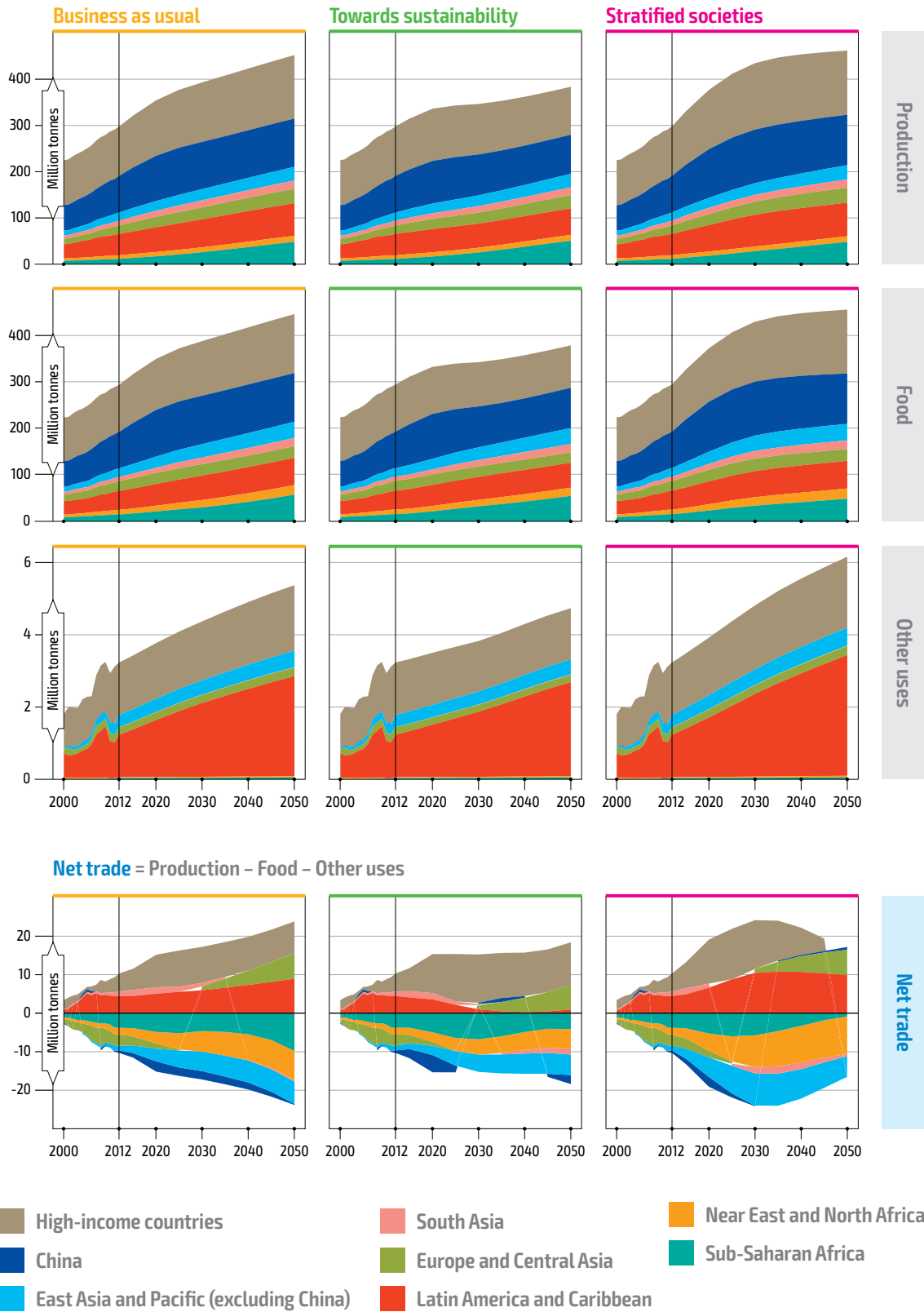
■ **BAU:** The BAU scenario projects that compared with 2012 levels, meat production and demand increase by around 52 percent in 2050; this follows the general increase of food consumption. Other uses of meat refer to non-food industries (e.g. cosmetics) and remain rather low, and thus current use levels are maintained in the projection (see [Figure S 1.2](#) and [Table S 1.2](#)). Under BAU, HIC expand existing capacities, with their production augmented by 28 percent between 2012 and 2050. In so doing, HIC continue to provide about 30 percent of global meat production throughout the simulation period, thereby improving both self-sufficiency ratios and trade balances. Also, China expands its installed capacities to maintain its current self-sufficiency level, and production increases by 23 percent between 2012 and 2050. Food consumption in China increases by almost as much as production during the same period, so that the trade balance is maintained.

Sub-Saharan Africa is the only region that almost quadruples its production by 2050 (see [Table S 1.2](#)). Still, this increase only leads SSA to expand its share in global meat production from 4 percent in 2012 to 11 percent in 2050. Expanding production in SSA strengthens self-sufficiency but not enough to cover the high demand linked to growing population and higher per capita meat consumption due to income growth. Thus, SSA remains a net importer of meat.

■ **TSS:** The TSS scenario, on the other hand, delineates a pathway towards lower consumption of meat compared with BAU. Global meat production increases by no more than 16 percent by 2030, and just under 30 percent by 2050 compared with 2012, due to lower demand and the adoption of less-intense production practices. These changes are more visible in HIC, where excess supply decreases gradually. In China, meat production slows down more than food demand does (compared to BAU), and unlike in HIC, this country increases its net imports of meat. TSS assumes higher income growth for LMIC compared with BAU. There is, however, a modest expansion of meat demand compared with this under BAU, which would have been otherwise much higher since meat is a luxury good for some LMIC and its consumption would have expanded substantially, had it not been for consumer awareness regarding sustainability issues. Developments in supply and demand are projected to have very limited effect on the self-sufficiency situation throughout the projection period.

■ **SSS:** The SSS scenario, on the contrary, projects higher meat consumption than BAU, as meat-based diets are adopted. In SSA, however, meat consumption in 2050 falls below what is seen under BAU because economic growth in this region slows down after 2030. The intensification of production systems increases production compared with BAU in almost all regions (especially in LAC and in SSA) throughout the projection period, the exception being MNA where natural resources are particularly scarce. In this scenario, LAC has the highest expansion in net exports and ECA turns into a net exporter; meanwhile, MNA has the highest increase in net imports and HIC turns into a net importer by 2050.

Figure S 1.2 Commodity balances for meat by region and scenario



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports). "Meat" comprises: beef meat, sheep and goat meat, pig meat and poultry meat.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.2 Meat: commodity balances by region and scenario

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|---|------------------------|----------------|------|------|------|------|------|------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Production | 107 | 128 | 109 | 144 | 137 | 104 | 139 | 128 | 97 | 130 |
| | Food | 101 | 117 | 95 | 129 | 127 | 91 | 137 | 125 | 90 | 136 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 185 | 144 | 200 |
| | Net trade | 5 | 9 | 13 | 13 | 8 | 11 | -1 | 176 | 235 | - |
| | Self-sufficiency ratio | 1.05 | 1.08 | 1.13 | 1.10 | 1.06 | 1.12 | 1.00 | 102 | 107 | 95 |
| East Asia and Pacific | Production | 97 | 126 | 112 | 141 | 134 | 114 | 140 | 138 | 118 | 145 |
| | Food | 97 | 133 | 115 | 149 | 140 | 121 | 144 | 144 | 125 | 149 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 27 | 25 | 29 |
| | Net trade | -2 | -7 | -4 | -9 | -6 | -8 | -5 | 319 | 405 | 245 |
| | Self-sufficiency ratio | 0.98 | 0.95 | 0.96 | 0.94 | 0.96 | 0.94 | 0.97 | 98 | 96 | 99 |
| China | Production | 79 | 102 | 89 | 116 | 105 | 84 | 109 | 132 | 107 | 138 |
| | Food | 79 | 104 | 88 | 116 | 105 | 87 | 108 | 133 | 110 | 138 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 |
| | Net trade | -1 | -2 | 0 | 0 | 0 | -2 | 1 | 40 | 360 | - |
| | Self-sufficiency ratio | 0.99 | 0.98 | 1.00 | 1.00 | 1.00 | 0.97 | 1.01 | 101 | 98 | 101 |
| East Asia and Pacific (excluding China) | Production | 18 | 24 | 23 | 25 | 29 | 29 | 31 | 168 | 167 | 175 |
| | Food | 18 | 29 | 27 | 33 | 35 | 34 | 35 | 189 | 186 | 194 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 111 | 103 | 120 |
| | Net trade | -1 | -5 | -4 | -8 | -6 | -5 | -5 | 466 | 428 | 431 |
| | Self-sufficiency ratio | 0.93 | 0.83 | 0.84 | 0.75 | 0.84 | 0.85 | 0.85 | 89 | 91 | 91 |
| South Asia | Production | 10 | 15 | 14 | 15 | 18 | 17 | 18 | 172 | 162 | 176 |
| | Food | 9 | 14 | 14 | 17 | 18 | 18 | 19 | 199 | 199 | 204 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 | 184 | 202 |
| | Net trade | 1 | 1 | 0 | -2 | 0 | -2 | -1 | - | - | - |
| | Self-sufficiency ratio | 1.13 | 1.07 | 1.02 | 0.90 | 0.98 | 0.91 | 0.97 | 87 | 81 | 86 |
| Europe and Central Asia | Production | 19 | 26 | 24 | 28 | 31 | 29 | 32 | 170 | 155 | 175 |
| | Food | 21 | 25 | 23 | 27 | 25 | 22 | 26 | 116 | 105 | 120 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 103 | 86 | 107 |
| | Net trade | -3 | 1 | 1 | 1 | 7 | 6 | 7 | - | - | - |
| | Self-sufficiency ratio | 0.86 | 1.04 | 1.05 | 1.04 | 1.27 | 1.29 | 1.26 | 147 | 149 | 145 |

Table S.1.2 Meat: commodity balances by region and scenario (continued)

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|--|------------------------|----------------|------|------|------|------|------|------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Production | 46 | 61 | 52 | 69 | 70 | 57 | 73 | 153 | 125 | 157 |
| | Food | 41 | 53 | 49 | 56 | 59 | 54 | 59 | 144 | 132 | 145 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 335 | 314 | 404 |
| | Net trade | 4 | 6 | 1 | 10 | 9 | 1 | 10 | 201 | 21 | 222 |
| | Self-sufficiency ratio | 1.11 | 1.11 | 1.02 | 1.18 | 1.15 | 1.02 | 1.16 | 103 | 92 | 105 |
| Near East and North Africa | Production | 8 | 10 | 10 | 10 | 13 | 13 | 12 | 164 | 159 | 154 |
| | Food | 10 | 16 | 14 | 18 | 21 | 18 | 22 | 208 | 178 | 221 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -24 | -23 | -27 |
| | Net trade | -2 | -5 | -4 | -8 | -8 | -5 | -10 | 433 | 291 | 559 |
| | Self-sufficiency ratio | 0.82 | 0.66 | 0.72 | 0.55 | 0.64 | 0.72 | 0.56 | 77 | 87 | 68 |
| Sub-Saharan Africa | Production | 11 | 26 | 25 | 28 | 48 | 51 | 48 | 427 | 447 | 425 |
| | Food | 15 | 31 | 32 | 34 | 58 | 55 | 49 | 380 | 359 | 320 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -49 | -48 | -42 |
| | Net trade | -4 | -5 | -7 | -6 | -10 | -4 | -1 | 259 | 109 | 22 |
| | Self-sufficiency ratio | 0.75 | 0.85 | 0.79 | 0.83 | 0.83 | 0.92 | 0.98 | 111 | 123 | 131 |
| Low- and middle-income countries | Production | 191 | 265 | 237 | 291 | 315 | 280 | 323 | 165 | 147 | 169 |
| | Food | 193 | 271 | 247 | 301 | 320 | 288 | 318 | 165 | 149 | 165 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 2 | 3 | 2 | 3 | 4 | 3 | 4 | 149 | 139 | 174 |
| | Net trade | -5 | -9 | -13 | -13 | -8 | -11 | 1 | 175 | 235 | - |
| | Self-sufficiency ratio | 0.98 | 0.97 | 0.95 | 0.96 | 0.97 | 0.96 | 1.00 | 100 | 99 | 103 |
| Low- and middle-income countries (excluding China) | Production | 112 | 162 | 149 | 175 | 210 | 195 | 214 | 188 | 175 | 192 |
| | Food | 115 | 167 | 159 | 185 | 215 | 201 | 210 | 187 | 175 | 183 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1 | 3 | 2 | 3 | 4 | 3 | 4 | 317 | 295 | 371 |
| | Net trade | -4 | -7 | -13 | -13 | -8 | -9 | 0 | 197 | 215 | 1 |
| | Self-sufficiency ratio | 0.96 | 0.96 | 0.92 | 0.93 | 0.96 | 0.96 | 1.00 | 100 | 99 | 104 |
| World | Production | 298 | 393 | 346 | 435 | 452 | 384 | 462 | 152 | 129 | 155 |
| | Food | 295 | 389 | 343 | 430 | 447 | 379 | 456 | 152 | 129 | 155 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 3 | 4 | 4 | 5 | 5 | 5 | 6 | 160 | 141 | 182 |
| | Net trade | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 100 | 100 | 100 |

Notes: Net trade is calculated as domestic production - aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Meat" comprises: beef meat, sheep and goat meat, pig meat and poultry meat. "Other uses" refers to the sum of non-food domestic uses, including: food losses, non-food processing, and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Fruit and vegetables

Fruit and vegetables gain prominence in diets due to income growth in LMIC, which enhances trends towards higher per capita consumption, as pointed out in Section 4.5 of the report. China plays a dominant role in fruit and vegetable markets, and in 2012 accounted for nearly 40 percent of global production.

■ **BAU:** In the BAU scenario, production worldwide is projected to increase by 33 percent between 2012 and 2030, and by 49 percent between 2012 and 2050. Most of the fruit and vegetables produced are for human consumption (83 percent in 2012, which increases to 84 percent in 2030 and to 85 percent in 2050; see [Figure S 1.3](#) and [Table S 1.3](#)). Relatively few regions use fruit and vegetables as animal feed, in which feed use is projected to decline throughout the simulation period as high prices make it less attractive to use fruit and vegetables for compound feed. Other uses generally mean non-food industry uses (e.g. cosmetics) when referring to HIC; this category grows until 2050 following the evolution of the entire economy. In most LMIC, on the other hand, other uses primarily refer to post-harvest losses due to the perishability of the commodities and the lack of adequate infrastructure.

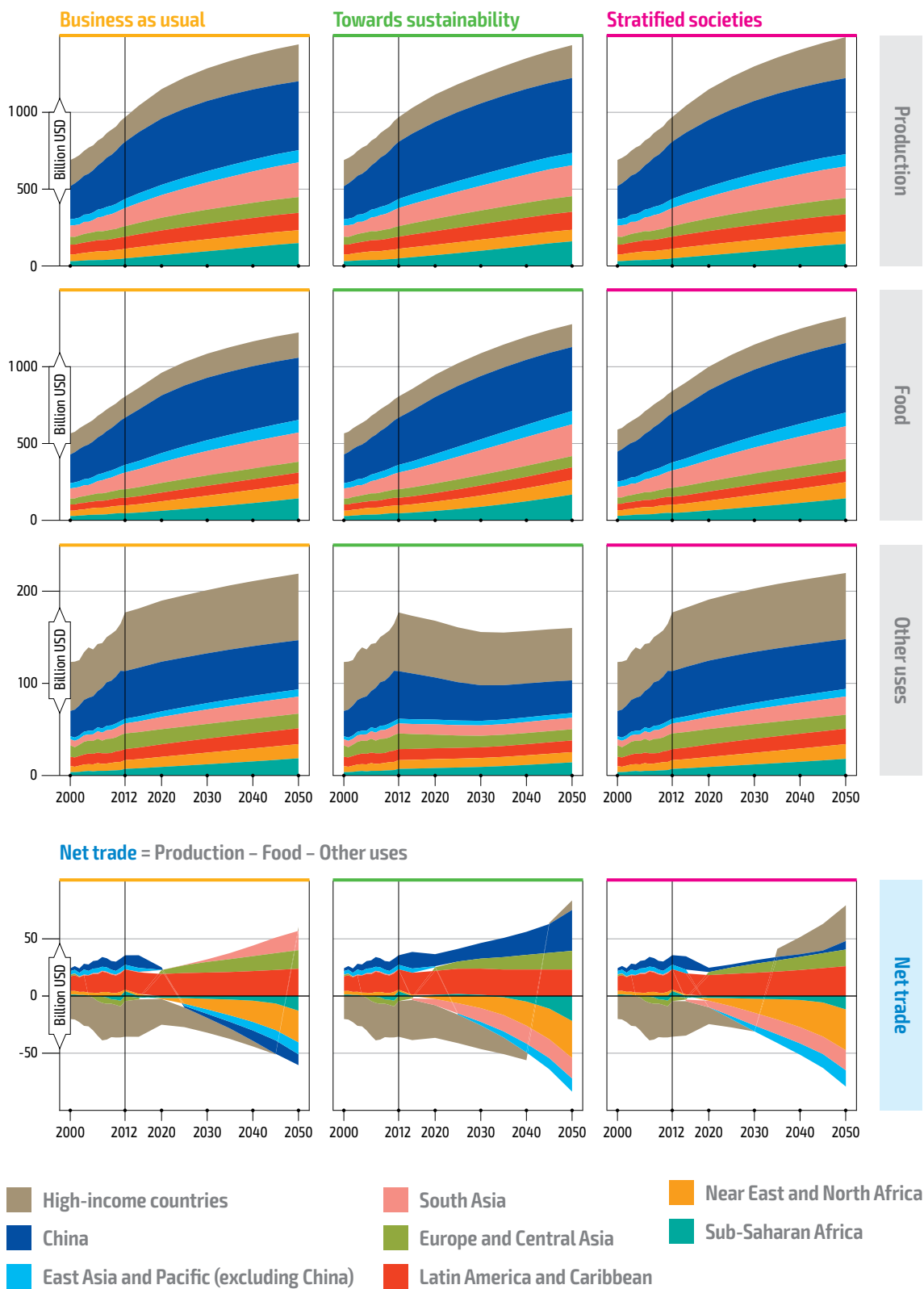
The highest increase of production in BAU takes place in SSA, where production is expected to triple by 2050 compared with 2012. This increase, however, falls short of substantially lifting the relevance of SSA on world markets, and by 2050 the region manages to supply just 11 percent of the world's fruit and vegetable production. Income and population growth in SSA triples food demand by 2050. Other uses of fruit and vegetables in SSA, as shown in [Table S 1.3](#), refer to post-harvest losses and are assumed to follow historical trends and thus increase proportionally to production volume. Had post-harvest losses been prevented through the installation of adequate infrastructure for marketing perishable products, SSA would have managed to maintain its self-sufficiency and stay a net exporter, but this is not the case under BAU projections.

While China's production is projected to increase by some 31 percent by 2050, food consumption also rises by more than 30 percent during the same period, causing the country to face a small excess demand and to become a net importer to satisfy its aggregate demand needs.

■ **TSS:** In the TSS scenario, more sustainable agricultural practices lead to slightly lower production expansion compared with BAU. The consumption of fruit and vegetables is higher, nonetheless, both because of the adoption of more sustainable diets – namely relatively lower consumption of animal protein, particularly in HIC and China – and of the greater economic growth and large population in LMIC. Until 2050, post-harvest losses are reduced and in LAC are kept to even lower levels than in 2012. The higher value of fruit and vegetables also reduces their use for animal feed, and so despite the lower production levels compared with BAU, regions and countries such as LAC, China, ECA and HIC manage to improve their trade balance and to maintain self-sufficiency ratios well above 1, with the latter becoming a small net exporter by 2050. By contrast, net importing regions (namely EAP, SSA and SAS) maintain self-sufficiency ratios around 0.9. In HIC, lower food consumption compared with BAU is due to lower economic growth.

■ **SSS:** In the SSS scenario, the patterns regarding demand and supply are similar to those under BAU, but different factors shape them. Under BAU, HIC and China already have intensive production systems, which they maintain under SSS, and thus expand their production by slightly more than under BAU. The higher level of economic growth in these regions also results in increased food consumption. Maintaining the same level of animal feed and other uses, combined with relatively unchanged food consumption compared to BAU, increases excess supply in both regions – this excess is exported to world markets. LMIC, and particularly SSA, are faced with lower economic growth and so fruit and vegetables in some countries are treated as luxury goods, implying that food consumption is overall lower than under BAU. These effects become more evident in the second half of the simulation period, when income disparities between the two scenarios become stronger and the different climate change patterns start affecting agriculture. Post-harvest losses when expressed as a share of production are above those of BAU, whereby production keeps expanding at the same pace or slightly slower in most LMIC. As a result, these countries become less self-sufficient and weaken their trade balance, thus increasing their net imports of fruit and vegetables.

Figure S 1.3 Commodity balances for fruit and vegetables by region and scenario, 2012 exchange rates



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: feed, seed, food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports). "Fruit and vegetables" comprise: bananas, citrus fruit, other fruit and vegetables.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.3 Fruit and vegetables: commodity balances by region and scenario

| REGIONS | BALANCE ITEMS | billion USD, 2012 exchange rates | | | | | | | index, 2012 = 100 | | |
|---|------------------------|----------------------------------|------|------|------|------|------|------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Production | 160 | 212 | 185 | 225 | 240 | 214 | 266 | 150 | 134 | 167 |
| | Food | 138 | 156 | 148 | 156 | 164 | 149 | 163 | 119 | 108 | 119 |
| | Feed | 14 | 13 | 10 | 14 | 12 | 9 | 11 | 89 | 64 | 80 |
| | Other uses | 40 | 56 | 48 | 55 | 60 | 48 | 61 | 151 | 121 | 154 |
| | Net trade | -31 | -13 | -21 | 0 | 3 | 8 | 31 | - | - | - |
| | Self-sufficiency ratio | 0.84 | 0.94 | 0.90 | 1.00 | 1.01 | 1.04 | 1.13 | 121 | 124 | 135 |
| East Asia and Pacific | Production | 432 | 530 | 537 | 546 | 528 | 568 | 575 | 122 | 132 | 133 |
| | Food | 357 | 477 | 482 | 486 | 487 | 503 | 520 | 136 | 141 | 145 |
| | Feed | 17 | 9 | 5 | 9 | 7 | 3 | 5 | 42 | 19 | 29 |
| | Other uses | 44 | 52 | 39 | 53 | 54 | 37 | 57 | 122 | 84 | 129 |
| | Net trade | 12 | -7 | 10 | -2 | -20 | 24 | -7 | - | 198 | - |
| | Self-sufficiency ratio | 1.03 | 0.99 | 1.02 | 1.00 | 0.96 | 1.04 | 0.99 | 94 | 101 | 96 |
| China | Production | 372 | 457 | 464 | 473 | 449 | 488 | 495 | 120 | 131 | 133 |
| | Food | 308 | 406 | 412 | 415 | 405 | 417 | 434 | 132 | 135 | 141 |
| | Feed | 17 | 8 | 5 | 9 | 7 | 3 | 5 | 41 | 19 | 28 |
| | Other uses | 40 | 46 | 34 | 47 | 46 | 32 | 49 | 117 | 81 | 125 |
| | Net trade | 8 | -4 | 14 | 3 | -9 | 36 | 7 | - | 433 | 90 |
| | Self-sufficiency ratio | 1.02 | 0.99 | 1.03 | 1.01 | 0.98 | 1.08 | 1.02 | 96 | 106 | 99 |
| East Asia and Pacific (excluding China) | Production | 59 | 73 | 72 | 73 | 80 | 80 | 80 | 135 | 136 | 135 |
| | Food | 50 | 70 | 71 | 71 | 82 | 87 | 86 | 165 | 174 | 172 |
| | Feed | 0.45 | 0.40 | 0.31 | 0.44 | 0.36 | 0.21 | 0.33 | 78 | 45 | 74 |
| | Other uses | 5 | 7 | 5 | 7 | 8 | 5 | 8 | 155 | 102 | 163 |
| | Net trade | 4 | -4 | -3 | -5 | -10 | -12 | -14 | - | - | - |
| | Self-sufficiency ratio | 1.07 | 0.95 | 0.96 | 0.93 | 0.88 | 0.87 | 0.85 | 82 | 82 | 79 |
| South Asia | Production | 119 | 177 | 161 | 167 | 226 | 201 | 206 | 190 | 170 | 174 |
| | Food | 109 | 159 | 161 | 162 | 190 | 207 | 203 | 175 | 190 | 187 |
| | Feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Other uses | 10 | 16 | 11 | 16 | 18 | 13 | 20 | 187 | 127 | 201 |
| | Net trade | 0.01 | 2 | -12 | -11 | 17 | -18 | -18 | 149 | 245 | - |
| | Self-sufficiency ratio | 1.00 | 1.01 | 0.93 | 0.94 | 1.08 | 0.92 | 0.92 | 108 | 92 | 92 |
| Europe and Central Asia | Production | 68 | 93 | 89 | 93 | 103 | 102 | 106 | 150 | 149 | 155 |
| | Food | 56 | 67 | 68 | 69 | 70 | 73 | 76 | 126 | 131 | 137 |
| | Feed | 6 | 4 | 3 | 4 | 3 | 2 | 2 | 49 | 35 | 30 |
| | Other uses | 10 | 12 | 10 | 12 | 13 | 10 | 13 | 123 | 95 | 127 |
| | Net trade | -4 | 9 | 9 | 8 | 16 | 16 | 15 | - | - | - |
| | Self-sufficiency ratio | 0.94 | 1.11 | 1.11 | 1.09 | 1.19 | 1.19 | 1.16 | 127 | 127 | 123 |

Table S 1.3 Fruit and vegetables: commodity balances by region and scenario (continued)

| REGIONS | BALANCE ITEMS | billion USD, 2012 exchange rates | | | | | | | index, 2012 = 100 | | |
|--|------------------------|----------------------------------|-------|-------|-------|-------|-------|-------|-------------------|--------|--------|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Production | 79 | 100 | 100 | 98 | 113 | 117 | 111 | 144 | 149 | 142 |
| | Food | 50 | 64 | 66 | 63 | 72 | 81 | 69 | 146 | 163 | 138 |
| | Feed | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 137 | 91 | 132 |
| | Other uses | 11 | 15 | 11 | 14 | 16 | 12 | 16 | 154 | 115 | 151 |
| | Net trade | 18 | 20 | 23 | 20 | 24 | 23 | 26 | 134 | 130 | 146 |
| | Self-sufficiency ratio | 1.29 | 1.26 | 1.30 | 1.26 | 1.27 | 1.25 | 1.30 | 98 | 96 | 101 |
| Near East and North Africa | Production | 62 | 78 | 73 | 76 | 84 | 75 | 81 | 134 | 120 | 131 |
| | Food | 51 | 75 | 73 | 76 | 96 | 96 | 101 | 187 | 188 | 197 |
| | Feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 27 | 20 |
| | Other uses | 9 | 13 | 10 | 13 | 15 | 11 | 16 | 164 | 118 | 170 |
| | Net trade | 1 | -9 | -11 | -12 | -28 | -32 | -36 | - | - | - |
| | Self-sufficiency ratio | 1.02 | 0.89 | 0.87 | 0.86 | 0.75 | 0.70 | 0.70 | 73 | 68 | 68 |
| Sub-Saharan Africa | Production | 50 | 96 | 99 | 94 | 149 | 160 | 143 | 301 | 323 | 289 |
| | Food | 45 | 86 | 88 | 84 | 143 | 168 | 137 | 314 | 369 | 301 |
| | Feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 454 | 198 | 463 |
| | Other uses | 0 | 12 | 9 | 12 | 18 | 14 | 18 | 14 939 | 11 554 | 14 437 |
| | Net trade | 4 | -2 | 1 | -3 | -13 | -22 | -12 | - | - | - |
| | Self-sufficiency ratio | 1.09 | 0.98 | 1.01 | 0.97 | 0.92 | 0.88 | 0.92 | 84 | 81 | 85 |
| Low- and middle-income countries | Production | 809 | 1 074 | 1 058 | 1 075 | 1 202 | 1 223 | 1 223 | 149 | 151 | 151 |
| | Food | 668 | 928 | 939 | 940 | 1 059 | 1 128 | 1 106 | 158 | 169 | 165 |
| | Feed | 25 | 14 | 8 | 14 | 12 | 6 | 8 | 47 | 26 | 33 |
| | Other uses | 85 | 119 | 90 | 120 | 136 | 97 | 140 | 160 | 115 | 166 |
| | Net trade | 31 | 13 | 21 | 0 | -3 | -8 | -31 | - | - | - |
| | Self-sufficiency ratio | 1.04 | 1.01 | 1.02 | 1.00 | 1.00 | 0.99 | 0.98 | 96 | 96 | 94 |
| Low- and middle-income countries (excluding China) | Production | 436 | 617 | 594 | 601 | 754 | 735 | 728 | 173 | 169 | 167 |
| | Food | 361 | 522 | 527 | 525 | 654 | 711 | 672 | 181 | 197 | 186 |
| | Feed | 8 | 5 | 4 | 5 | 5 | 3 | 3 | 60 | 41 | 44 |
| | Other uses | 45 | 74 | 56 | 74 | 89 | 65 | 91 | 198 | 144 | 202 |
| | Net trade | 23 | 16 | 7 | -3 | 6 | -44 | -39 | 26 | - | - |
| | Self-sufficiency ratio | 1.06 | 1.03 | 1.01 | 1.00 | 1.01 | 0.94 | 0.95 | 96 | 89 | 90 |
| World | Production | 969 | 1 286 | 1 244 | 1 299 | 1 442 | 1 437 | 1 489 | 149 | 148 | 154 |
| | Food | 806 | 1 085 | 1 088 | 1 096 | 1 223 | 1 277 | 1 269 | 152 | 158 | 157 |
| | Feed | 38 | 26 | 18 | 28 | 24 | 15 | 19 | 62 | 40 | 49 |
| | Other uses | 124 | 175 | 138 | 176 | 195 | 145 | 201 | 157 | 117 | 162 |
| | Net trade | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 100 | 100 | 100 |

Notes: Net trade is calculated as domestic production - aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Fruit and vegetables" comprise: bananas, citrus fruit, other fruit and vegetables. "Other uses" refers to the sum of non-food domestic uses, including: seed, waste, non-food processing, and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Dairy products²

■ **BAU:** In the BAU scenario global production increases by 26 percent between 2012 and 2030 and by 40 percent between 2012 and 2050 (see [Figure S 1.4](#) and [Table S 1.4](#)). Production of milk-based commodities is closely linked to meat production of the respective animals and so production is not only motivated by developments in food consumption for dairy but by the expansion of ruminant herds to supply meat.

Milk, however, is considered as a basic commodity in HIC and a few LMIC, such as China, and so their per capita consumption hardly expands due to higher incomes compared to meat consumption. Furthermore, as with meat, more dairy products are expected to be consumed in LMIC, as markets become more globalized and as incomes increase. This however leads to changes in production in the long term with LMIC (excluding China) expanding their production by some 80 percent in 2050 compared to 2012. They overtake HIC in world markets and account for 75 percent of the global milk production in 2050, compared with 60 percent in 2012. HIC, on the contrary, lose 15 percent of their market share and their production shrinks by 14 percent between 2012 and 2050. To satisfy their domestic demand, which increases at rates similar to those of their population, they turn into net importers sourcing from LMIC.

Sub-Saharan Africa is the region with the highest increase in food consumption of dairy, which increases on 2012 by 2.2 times in 2030 and by 3.7 times in 2050. Production, following also the changes in meat production, is projected to expand more than in other regions and to more than double by 2030 and nearly quadruple by 2050, allowing for a notable improvement of the SSA trade balance. The expansion of net exports in ECA is because of a dynamic increase in production motivated by growing meat demand rather than any growing demand for dairy. ECA countries accounted for 14 percent of milk production in 2012, implying that increased meat production leads to subsequent increases of dairy herds and thus excess milk supply.

■ **TSS:** The TSS scenario delineates lower production and consumption of milk compared with BAU, but consuming milk as a basic product results in smaller differences compared to those between TSS and BAU in meat markets. In HIC, consumer awareness of sustainability issues and lower income expansion lead to a greater decrease in milk production, which by 2050 falls 37 percent lower than in 2012. This leads HIC to double their net imports against BAU, sourcing these imports from LMIC. Consumer awareness also results in LMIC not expanding consumption more than in BAU, although consumers enjoy higher income growth. Greater economic growth, however, leads LMIC to expand their production capacities, with SSA in particular increasing its production more than 5 times by 2050 compared to 2012 (against nearly 4 times in the BAU scenario) and substantially boosting its net exports.

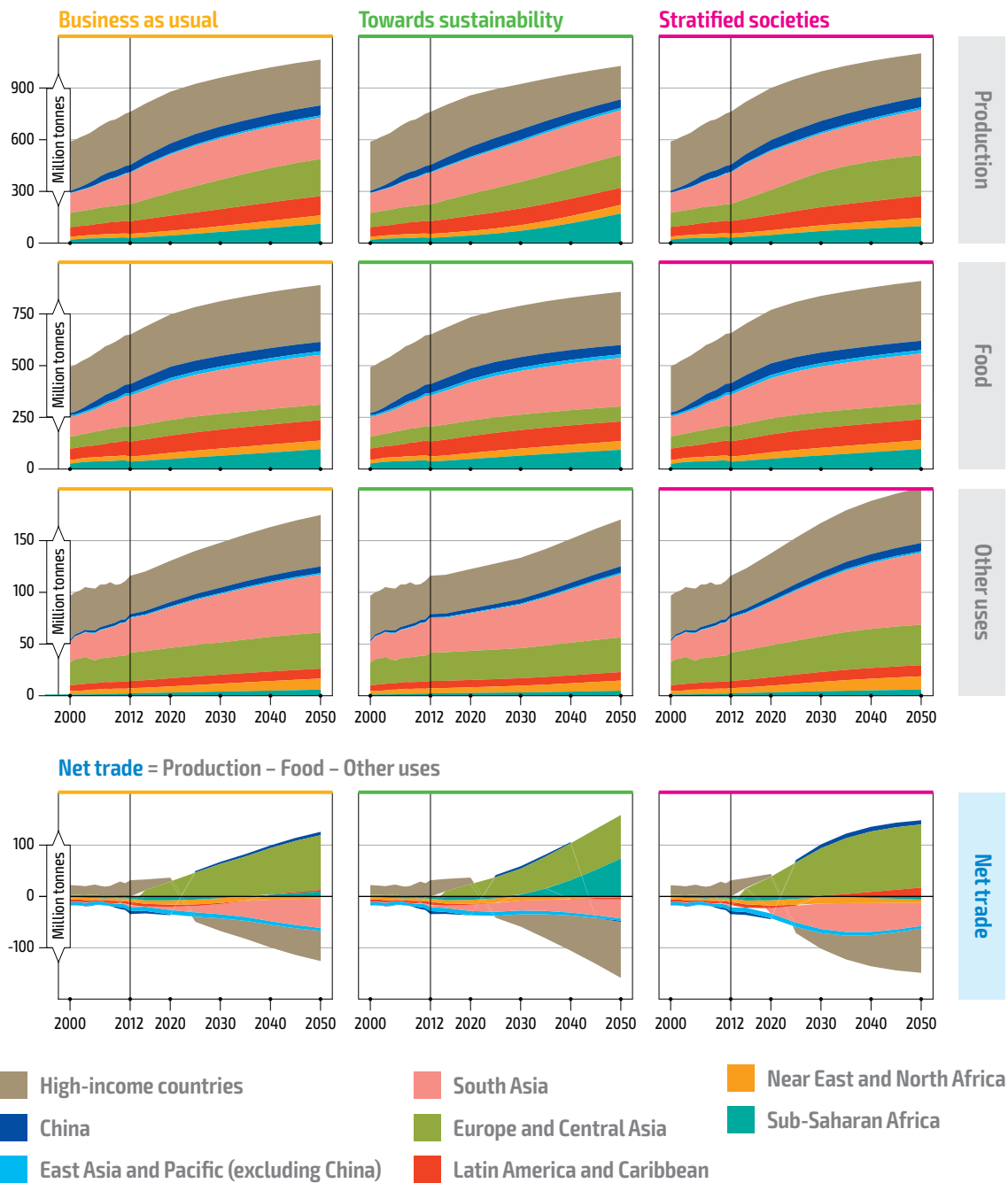
■ **SSS:** The SSS scenario projects similar global production and consumption of dairy as in BAU, though for different reasons in LMIC. These countries are faced with lower incomes, which makes their consumers treat milk as a luxury rather than as a normal or inferior good, thus resulting in consumption levels similar to those in BAU. These developments together with the changes in meat markets lead to an expansion of the ruminant herds

² All dairy products (e.g. cheese, milk powder etc. but excluding butter – butter is part of the animal fats in FAOSTAT's Food Balance Sheets) are expressed in liquid milk equivalent (whole milk equivalent). Reference to milk hence does not involve only fresh milk but all dairy products.

and subsequently to increases in milk production. In some regions production increases more than in BAU, such as ECA, where dairy herds prevail.

Other uses of milk-based products are a small portion of milk production and comprise: in LMIC, primarily losses in processing, due to the perishability of the commodities (and lack of adequate infrastructure to prevent perishing); and, in HIC, industrial uses, e.g. for cosmetics and pharmaceuticals.

Figure S 1.4 Commodity balances for dairy products by region and scenario (in whole milk equivalent)



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.4 Dairy products: commodity balances by region and scenario

| REGIONS | BALANCE ITEMS | million tonnes, whole milk equivalent | | | | | | | index, 2012 = 100 | | |
|---|------------------------|---------------------------------------|------|------|------|------|------|------|-------------------|------|------|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Production | 308 | 283 | 264 | 287 | 266 | 194 | 253 | 86 | 63 | 82 |
| | Food | 239 | 264 | 248 | 270 | 275 | 258 | 286 | 115 | 108 | 119 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 37 | 44 | 40 | 48 | 50 | 45 | 54 | 135 | 122 | 145 |
| | Net trade | 32 | -25 | -24 | -31 | -59 | -109 | -87 | - | - | - |
| | Self-sufficiency ratio | 1.11 | 0.92 | 0.92 | 0.90 | 0.82 | 0.64 | 0.74 | 73 | 57 | 67 |
| East Asia and Pacific | Production | 47 | 70 | 70 | 74 | 71 | 63 | 74 | 152 | 134 | 159 |
| | Food | 56 | 67 | 67 | 67 | 62 | 62 | 61 | 112 | 111 | 110 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 4 | 6 | 6 | 8 | 8 | 8 | 10 | 173 | 169 | 215 |
| | Net trade | -13 | -4 | -2 | 0 | 1 | -7 | 3 | - | 51 | - |
| | Self-sufficiency ratio | 0.78 | 0.94 | 0.97 | 0.99 | 1.01 | 0.90 | 1.05 | 130 | 116 | 135 |
| China | Production | 41 | 60 | 60 | 65 | 58 | 49 | 61 | 141 | 118 | 147 |
| | Food | 44 | 51 | 51 | 51 | 45 | 45 | 44 | 104 | 103 | 102 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 4 | 5 | 5 | 6 | 6 | 6 | 8 | 173 | 167 | 217 |
| | Net trade | -6 | 4 | 5 | 8 | 7 | -2 | 8 | - | 39 | - |
| | Self-sufficiency ratio | 0.88 | 1.07 | 1.09 | 1.13 | 1.13 | 0.96 | 1.16 | 129 | 109 | 132 |
| East Asia and Pacific (excluding China) | Production | 5 | 9 | 10 | 10 | 13 | 14 | 14 | 240 | 260 | 257 |
| | Food | 12 | 16 | 16 | 16 | 17 | 17 | 17 | 142 | 140 | 140 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 175 | 178 | 204 |
| | Net trade | -8 | -8 | -7 | -8 | -6 | -5 | -5 | 76 | 60 | 64 |
| | Self-sufficiency ratio | 0.42 | 0.53 | 0.57 | 0.54 | 0.69 | 0.75 | 0.74 | 167 | 182 | 178 |
| South Asia | Production | 182 | 239 | 234 | 222 | 239 | 260 | 264 | 132 | 143 | 145 |
| | Food | 151 | 213 | 211 | 218 | 241 | 235 | 239 | 160 | 156 | 159 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 34 | 47 | 42 | 54 | 56 | 61 | 69 | 166 | 181 | 206 |
| | Net trade | -3 | -20 | -19 | -50 | -58 | -37 | -45 | 1818 | 1160 | 1418 |
| | Self-sufficiency ratio | 0.98 | 0.92 | 0.92 | 0.82 | 0.81 | 0.88 | 0.85 | 82 | 89 | 87 |
| Europe and Central Asia | Production | 98 | 171 | 154 | 204 | 216 | 191 | 237 | 221 | 196 | 243 |
| | Food | 71 | 76 | 75 | 77 | 75 | 73 | 75 | 105 | 103 | 105 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 28 | 31 | 29 | 35 | 35 | 33 | 39 | 124 | 119 | 140 |
| | Net trade | -1 | 63 | 50 | 92 | 107 | 85 | 123 | - | - | - |
| | Self-sufficiency ratio | 0.99 | 1.59 | 1.48 | 1.83 | 1.97 | 1.80 | 2.08 | 200 | 182 | 211 |

Table S 1.4 Dairy products: commodity balances by region and scenario (continued)

| REGIONS | BALANCE ITEMS | million tonnes, whole milk equivalent | | | | | | | index, 2012 = 100 | | |
|--|------------------------|---------------------------------------|------|------|------|-------|-------|-------|-------------------|------|------|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Production | 74 | 99 | 97 | 105 | 112 | 99 | 127 | 151 | 134 | 172 |
| | Food | 73 | 92 | 89 | 94 | 99 | 95 | 99 | 135 | 130 | 136 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 7 | 9 | 7 | 10 | 10 | 8 | 11 | 137 | 117 | 152 |
| | Net trade | -6 | -2 | 0 | 2 | 3 | -4 | 17 | - | 71 | - |
| | Self-sufficiency ratio | 0.92 | 0.98 | 1.00 | 1.02 | 1.03 | 0.96 | 1.16 | 112 | 104 | 125 |
| Near East and North Africa | Production | 23 | 33 | 33 | 33 | 49 | 50 | 48 | 209 | 216 | 208 |
| | Food | 24 | 35 | 34 | 36 | 42 | 42 | 42 | 172 | 174 | 173 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 5 | 8 | 7 | 9 | 11 | 10 | 13 | 201 | 186 | 242 |
| | Net trade | -6 | -9 | -8 | -12 | -4 | -2 | -6 | 57 | 25 | 103 |
| | Self-sufficiency ratio | 0.79 | 0.78 | 0.80 | 0.74 | 0.93 | 0.97 | 0.88 | 118 | 123 | 112 |
| Sub-Saharan Africa | Production | 30 | 65 | 71 | 69 | 112 | 172 | 97 | 370 | 568 | 322 |
| | Food | 36 | 64 | 64 | 66 | 96 | 93 | 97 | 269 | 259 | 271 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | -1 | 4 | 3 | 4 | 6 | 5 | 6 | -463 | -379 | -467 |
| | Net trade | -4 | -3 | 3 | -2 | 9 | 74 | -6 | - | - | 138 |
| | Self-sufficiency ratio | 0.88 | 0.95 | 1.05 | 0.98 | 1.09 | 1.76 | 0.94 | 125 | 201 | 108 |
| Low- and middle-income countries | Production | 453 | 677 | 659 | 708 | 799 | 834 | 848 | 176 | 184 | 187 |
| | Food | 410 | 547 | 541 | 558 | 615 | 600 | 614 | 150 | 146 | 149 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 77 | 105 | 94 | 120 | 125 | 125 | 148 | 162 | 162 | 191 |
| | Net trade | -34 | 25 | 24 | 31 | 59 | 109 | 87 | - | - | - |
| | Self-sufficiency ratio | 0.93 | 1.04 | 1.04 | 1.05 | 1.08 | 1.15 | 1.11 | 116 | 124 | 120 |
| Low- and middle-income countries (excluding China) | Production | 412 | 616 | 599 | 643 | 741 | 785 | 788 | 180 | 191 | 191 |
| | Food | 367 | 496 | 490 | 507 | 570 | 555 | 569 | 155 | 151 | 155 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 74 | 100 | 89 | 114 | 119 | 119 | 140 | 161 | 162 | 190 |
| | Net trade | -29 | 21 | 19 | 23 | 52 | 111 | 78 | - | - | - |
| | Self-sufficiency ratio | 0.94 | 1.03 | 1.03 | 1.04 | 1.08 | 1.17 | 1.11 | 115 | 125 | 119 |
| World | Production | 762 | 960 | 923 | 995 | 1 065 | 1 028 | 1 101 | 140 | 135 | 145 |
| | Food | 650 | 811 | 789 | 828 | 890 | 857 | 899 | 137 | 132 | 138 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 112 | 148 | 134 | 168 | 175 | 171 | 202 | 157 | 153 | 181 |
| | Net trade | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 100 | 100 | 100 |

Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" refers to the sum of non-food domestic uses, including: food losses, non-food processing, and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Eggs

Developments in egg production and consumption are analogous to those of milk and follow developments in meat (poultry), although egg production is less connected to the expansion of poultry meat. The shorter life cycle of poultry compared to ruminants allows production to adjust in a more flexible way and to expand towards less laying hens and more broilers and vice versa, depending on whether meat or eggs are most in demand. Moreover, eggs are considered as normal to inferior goods in some countries (e.g. China), so that in the long term an increase in per capita income leads to a small decrease in per capita food consumption. In these countries it is thus population growth that changes food consumption rather than income or prices.

■ **BAU:** Continuation of historical trends and consumer preferences in the BAU scenario increases global egg consumption by some 39 percent between 2012 and 2050, followed by similar increases in global production (see [Figure S 1.5](#) and [Table S 1.5](#)). In HIC and in China increases of consumption between 2012 and 2050 are mainly due to population growth and are around 27 percent in HIC and 19 percent in China. In other LMIC (namely excluding China) egg consumption increases not only because of population growth but also because of income growth and is affected more by price developments. LMIC excluding China are projected to consume 67 percent more eggs in 2050 compared with 2012. Production increases in LMIC (excluding China) are projected to be of similar magnitude, allowing LMIC to expand their market share from 37 percent of the world's egg production in 2012 to 47 percent in 2050. As with meat and milk markets, SSA is the region with the highest increase in production (6.1 times more in 2050 compared to 2012). While China is projected to maintain its self-sufficiency and to remain the biggest egg producer, HIC are projected to expand their production at a slower pace than their consumption, adjusting to the higher production in LMIC, leading them to increase their net imports to cover domestic demand.

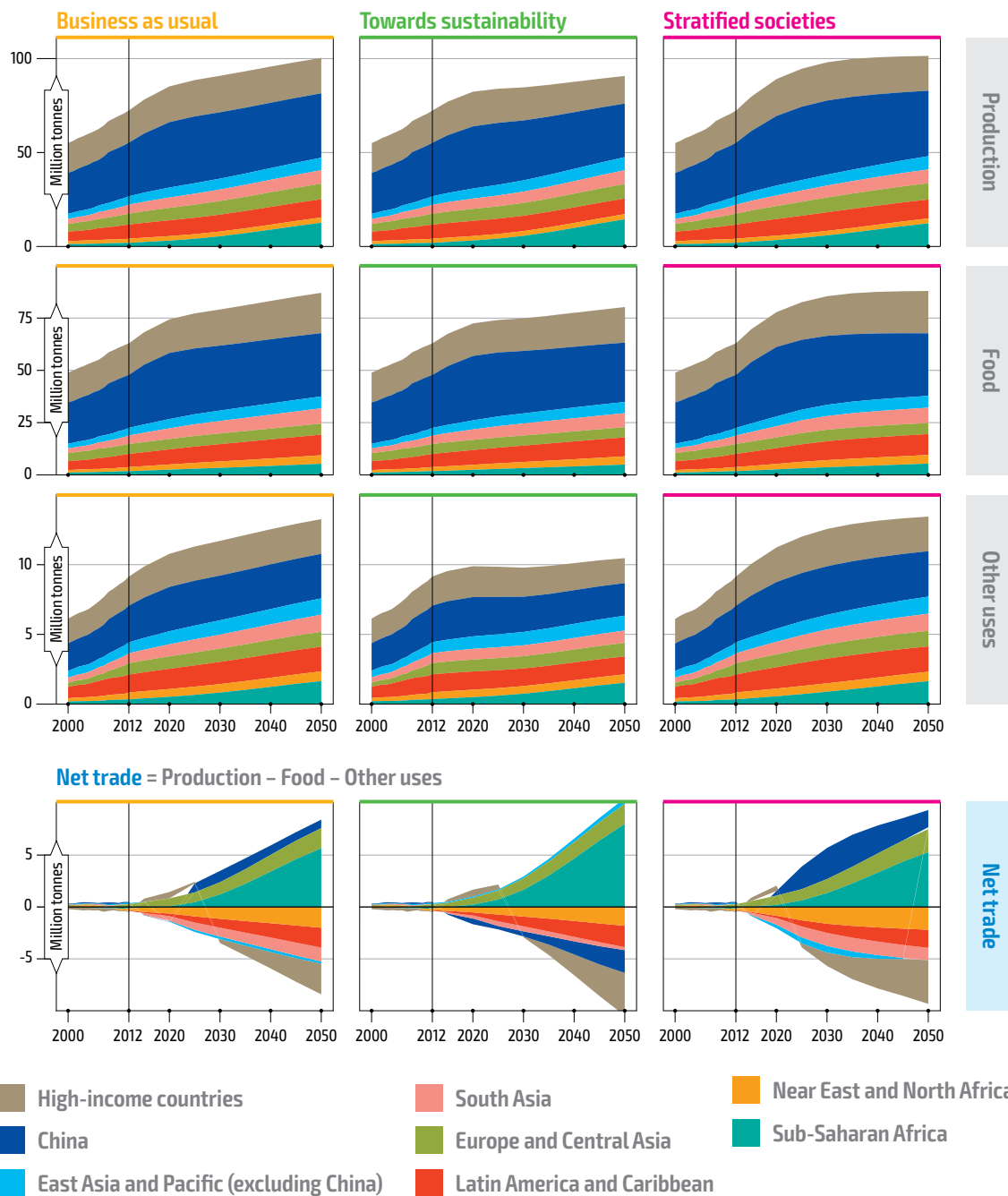
■ **TSS:** As with milk and dairy, the TSS scenario projects lower consumption and production of eggs in HIC and in China in particular, motivated mainly by consumer awareness for less animal-based products but also by the higher food prices. In HIC, production is expected to decrease by 14 percent in 2050 compared to 2012 and in China to return to the historical levels of 2012, decreasing the share of HIC in global egg production from 24 percent to 16 percent in 2050 and of China from 39 percent to 31 percent. In LMIC, consumer awareness on sustainability issues constrains consumption to lower levels than under BAU, which would have been otherwise higher if affected only by the greater income growth. The simultaneous slowdown of production, especially in HIC leaves more ground to LMIC and in particular SSA to expand their production and to improve their trade balance.

■ **SSS:** In SSS, consumption of eggs in HIC and in China increases more than in BAU, motivated by consumer preferences towards animal products, rather than by higher income growth (since income hardly affects per capita egg consumption in these countries). In LMIC excluding China, both higher income than in BAU and consumer preferences towards more animal products leads to higher food consumption of eggs; 12 percent higher than in BAU between 2012 and 2030 and, thereafter, similar increases to BAU due to price increases. As in BAU, production increases in China slightly more than consumption. In LMIC production increases more than in HIC, motivated by simultaneous

changes in consumption both in LMIC and in HIC – this allows LMIC to take market share from HIC already in 2030 and to expand further their production by some 80 percent by 2050 compared with 2012.

Other uses of eggs are a very small proportion of production, as shown in Table S 1.5, and involve primarily losses in processing, as well as uses in industry for cosmetics and pharmaceuticals. Industrial uses grow in each scenario following the growth of the economy, while losses in processing are lower in TSS as explained in Section 3.6 of the report.

Figure S 1.5 Commodity balances for eggs by region and scenario



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.5 Eggs: commodity balances by region and scenario

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|---|------------------------|----------------|------|------|------|------|------|------|-------------------|-------|-------|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Production | 17 | 19 | 18 | 20 | 19 | 15 | 19 | 110 | 86 | 108 |
| | Food | 15 | 17 | 16 | 19 | 19 | 17 | 20 | 127 | 112 | 134 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 118 | 85 | 117 |
| | Net trade | 0 | 0 | 0 | -1 | -3 | -4 | -4 | 3 025 | 4 220 | 4 329 |
| | Self-sufficiency ratio | 0.99 | 0.98 | 1.00 | 0.94 | 0.86 | 0.78 | 0.81 | 87 | 79 | 82 |
| East Asia and Pacific | Production | 33 | 41 | 38 | 45 | 41 | 35 | 42 | 124 | 107 | 127 |
| | Food | 29 | 36 | 35 | 38 | 36 | 34 | 36 | 124 | 116 | 123 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 4 | 4 | 3 | 5 | 4 | 3 | 4 | 114 | 89 | 117 |
| | Net trade | 0 | 1 | 0 | 2 | 1 | -2 | 2 | 299 | - | 902 |
| | Self-sufficiency ratio | 1.01 | 1.02 | 0.99 | 1.06 | 1.02 | 0.95 | 1.05 | 101 | 95 | 104 |
| China | Production | 28 | 35 | 32 | 39 | 34 | 29 | 35 | 120 | 100 | 122 |
| | Food | 25 | 31 | 30 | 33 | 30 | 28 | 30 | 119 | 112 | 118 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 105 | 77 | 107 |
| | Net trade | 0 | 1 | 0 | 3 | 1 | -2 | 2 | 783 | - | 1 586 |
| | Self-sufficiency ratio | 1.00 | 1.03 | 0.98 | 1.08 | 1.02 | 0.93 | 1.05 | 102 | 93 | 105 |
| East Asia and Pacific (excluding China) | Production | 5 | 6 | 6 | 6 | 7 | 7 | 7 | 147 | 153 | 156 |
| | Food | 4 | 5 | 5 | 5 | 6 | 5 | 6 | 156 | 147 | 156 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 148 | 135 | 155 |
| | Net trade | 0 | 0 | 0 | -1 | 0 | 1 | 0 | - | 529 | 183 |
| | Self-sufficiency ratio | 1.02 | 0.96 | 1.03 | 0.90 | 0.97 | 1.08 | 1.03 | 95 | 106 | 100 |
| South Asia | Production | 5 | 6 | 6 | 6 | 7 | 7 | 7 | 151 | 154 | 154 |
| | Food | 4 | 6 | 6 | 7 | 7 | 7 | 7 | 179 | 165 | 179 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 179 | 129 | 180 |
| | Net trade | 0 | -1 | 0 | -1 | -1 | 0 | -1 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 0.88 | 0.93 | 0.84 | 0.84 | 0.96 | 0.86 | 84 | 96 | 86 |
| Europe and Central Asia | Production | 6 | 7 | 7 | 8 | 8 | 8 | 9 | 142 | 133 | 149 |
| | Food | 5 | 5 | 5 | 6 | 5 | 5 | 5 | 111 | 102 | 113 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 129 | 118 | 135 |
| | Net trade | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 743 | 743 | 850 |
| | Self-sufficiency ratio | 1.05 | 1.20 | 1.19 | 1.21 | 1.31 | 1.33 | 1.35 | 125 | 127 | 128 |

Table S 1.5 Eggs: commodity balances by region and scenario (continued)

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|--|------------------------|----------------|------|------|------|------|------|------|-------------------|-------|-------|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Production | 7 | 9 | 8 | 10 | 10 | 8 | 10 | 130 | 111 | 134 |
| | Food | 6 | 8 | 8 | 9 | 10 | 9 | 10 | 157 | 145 | 159 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 139 | 101 | 143 |
| | Net trade | 0 | -1 | -1 | -1 | -2 | -2 | -2 | 3 151 | 3 377 | 2 863 |
| | Self-sufficiency ratio | 0.99 | 0.91 | 0.90 | 0.92 | 0.84 | 0.80 | 0.85 | 84 | 81 | 86 |
| Near East and North Africa | Production | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 125 | 123 | 119 |
| | Food | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 203 | 197 | 207 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 166 | 143 | 160 |
| | Net trade | 0 | -1 | -1 | -2 | -2 | -2 | -2 | 944 | 858 | 1039 |
| | Self-sufficiency ratio | 0.91 | 0.69 | 0.73 | 0.60 | 0.58 | 0.60 | 0.54 | 64 | 66 | 60 |
| Sub-Saharan Africa | Production | 2 | 5 | 6 | 6 | 13 | 14 | 12 | 653 | 747 | 636 |
| | Food | 2 | 3 | 3 | 4 | 5 | 5 | 5 | 301 | 278 | 304 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 611 | 563 | 611 |
| | Net trade | 0 | 1 | 2 | 1 | 6 | 8 | 5 | - | - | - |
| | Self-sufficiency ratio | 0.95 | 1.28 | 1.41 | 1.29 | 1.81 | 2.24 | 1.75 | 191 | 236 | 185 |
| Low- and middle-income countries | Production | 55 | 71 | 67 | 78 | 82 | 76 | 83 | 148 | 138 | 150 |
| | Food | 48 | 62 | 59 | 67 | 68 | 63 | 68 | 142 | 132 | 141 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 7 | 9 | 8 | 10 | 11 | 9 | 11 | 148 | 119 | 150 |
| | Net trade | 0 | 0 | 0 | 1 | 3 | 4 | 4 | 3 080 | 4 296 | 4 408 |
| | Self-sufficiency ratio | 1.00 | 1.01 | 1.00 | 1.02 | 1.04 | 1.06 | 1.05 | 104 | 106 | 105 |
| Low- and middle-income countries (excluding China) | Production | 27 | 36 | 35 | 38 | 47 | 48 | 48 | 177 | 178 | 180 |
| | Food | 22 | 31 | 29 | 34 | 38 | 35 | 38 | 167 | 155 | 168 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 4 | 6 | 5 | 6 | 8 | 6 | 8 | 178 | 149 | 181 |
| | Net trade | 0 | -1 | 1 | -2 | 2 | 6 | 3 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 0.98 | 1.02 | 0.96 | 1.05 | 1.15 | 1.06 | 105 | 115 | 106 |
| World | Production | 72 | 91 | 85 | 98 | 100 | 91 | 101 | 139 | 125 | 140 |
| | Food | 63 | 79 | 75 | 85 | 87 | 80 | 88 | 138 | 127 | 140 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 9 | 12 | 10 | 13 | 13 | 10 | 13 | 141 | 111 | 143 |
| | Net trade | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 100 | 100 | 100 |

Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" refers to the sum of non-food domestic uses, including: food losses, non-food processing, and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Fish

Fish will likely gain relevance in LMIC diets as these countries' income grows, boosting per capita consumption, as discussed in Section 4.5 of the report. Consumption, however, will remain concentrated in those countries where production takes place, namely with extended coastal zones. The perishability of the commodity makes it difficult to transfer it to continental areas when adequate infrastructure is missing. This makes consumers in continental areas generally more reactive to price changes and has also shaped consumer preferences over time. The food use of fish in 2012 was more than 83 percent of the total absorption, as [Table S 1.6](#) shows. The remaining part is for animal feed and for non-food industry (e.g. pharmaceuticals).³

In all scenarios the supply of fish follows changes in potential catch due to climate change and expectations on the growth of aquaculture.⁴

■ **BAU:** In the BAU scenario, global fish production is projected to increase by 35 percent between 2012 and 2050 (see [Figure S 1.6](#) and [Table S 1.6](#)). EAP is expected to maintain its prominence, with China [expanding its production](#) by almost 57 percent by 2050. South Asia is expected to expand production by nearly 75 percent to 2050; however, this increase will only translate into a 1 percent increase of its share in global production (from 7 percent in 2012 to 8 percent in 2050).

The expected expansion of fish production under BAU is essentially linked to satisfying food demand, which is projected to increase by nearly 15 percent between 2012 and 2050. Consumption increases slow down after 2030 because of higher prices for fish, which partly offset higher food demand due to income growth. This effect will be felt more in HIC, where income growth also slows down, with food demand expected to decline by 6 percent and 13 percent by 2030 and 2050, respectively, compared with 2012 levels.

Sub-Saharan Africa, on the other hand, almost triples food use of fish by 2050, thus becoming an important consumer of fish at a world level. By 2050 SSA accounts for about 16 percent of the fish consumed worldwide. Given the constraints in marine and aquaculture systems, SSA is projected to satisfy its demand not only by expanding domestic production but also by increasing imports. The picture is similar in EAP (excluding China), where the expansion of food use is projected to grow by 36 percent between 2012 and 2050, thereby exceeding domestic supply. As a result, EAP (excluding China), is projected to turn into a net importer of fish. China, due to its slower population expansion, is projected to show a 6 percent drop in fish consumption between 2012 and 2050, thus directing its excess supply to the world markets.

■ **TSS:** The TSS scenario accounts for the effects of more favourable climatic conditions on marine production systems. By 2050, global fish production under this scenario increases by 37 percent compared to 2012, instead of 35 percent under BAU. Production is expected to be slightly higher in EAP, SAS and SSA. This increased production, however, is not expected to alter the relative shares of the three regions in world production. Slower income growth in HIC and China under TSS reduces food demand by about 20 percent in 2030 and 8 percent in 2050 when compared with BAU (prompting lower consumption globally). In LMIC (excluding China), higher income growth goes hand in hand with higher

³ Fishmeal is a separate commodity and is not included under feed demand in this report.

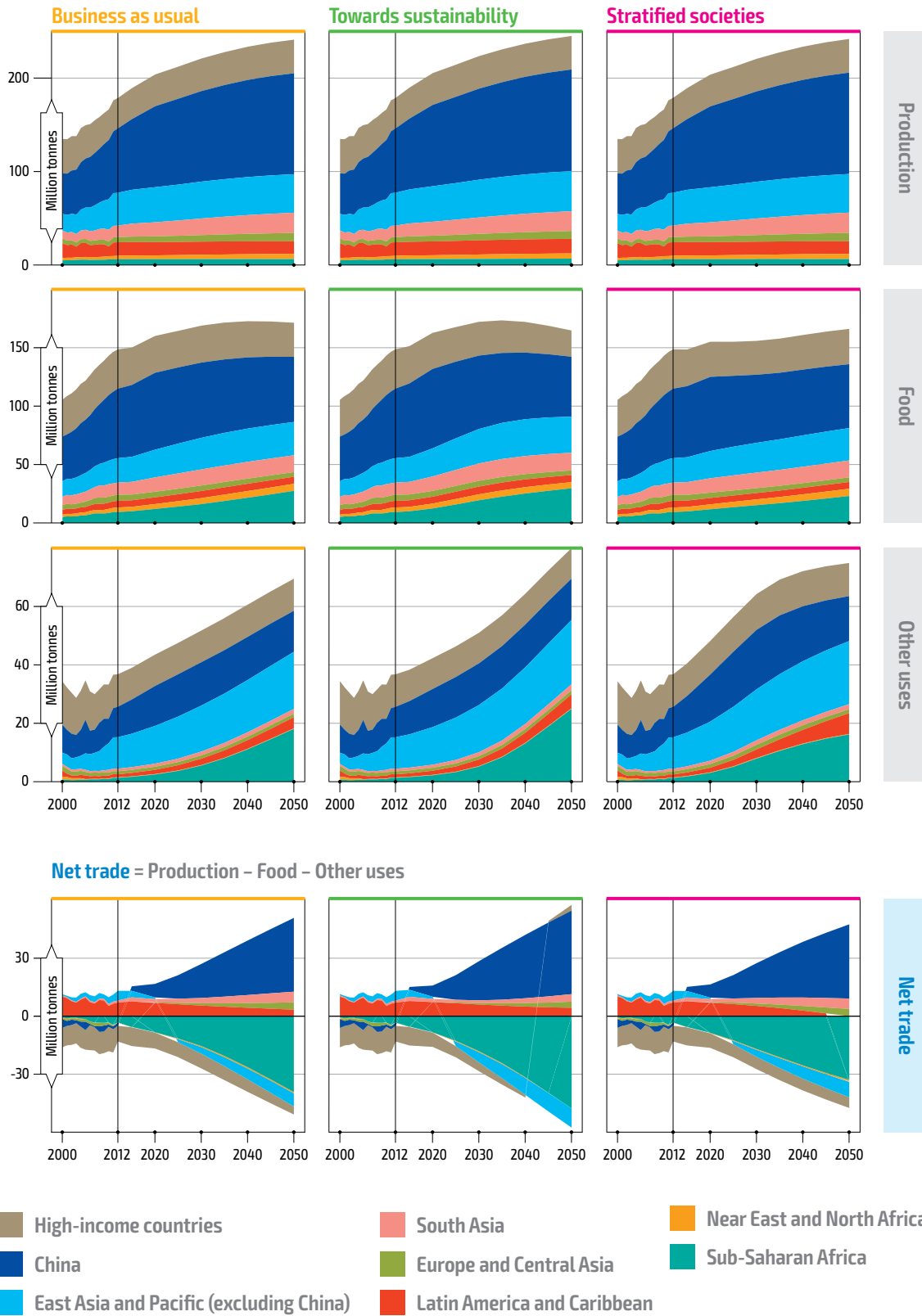
⁴ As explained in Section 3.12 of the report, contrary to all the other commodities included in the FAO GAPS model, the supply of fish is exogenous.

consumption levels, which in the case of EAP (excluding China) in 2050 are projected to be 48 percent higher than in 2012 (against 36 percent under BAU).

■ **SSS:** The SSS scenario borrows the BAU assumptions on fish supply, as explained in Section 3.12 of the report. Given, however, more inequality in income distribution across countries, by 2050 food demand for fish in LMIC (excluding China) is expected to increase by 18 percent less than under BAU, while more prominence is given to HIC than in BAU. Sub-Saharan Africa is projected to increase its food demand by 2.5 times by 2050 compared with 2012 (against almost 3 times under BAU), whereas China is projected to reduce its food demand by nearly 8 percent in 2050 with respect to 2012. Although import needs in SSA are projected to be lower than under BAU, a larger excess supply is seen in China such that no visible changes in net trade are projected compared with BAU.

In each country, “other uses” follows the evolution of the entire economy and throughout the projected period – and in all three scenarios analysed – it maintains its relatively small share in total fish absorption.

Figure S 1.6 Commodity balances for fish by region and scenario



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: feed, food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports).

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.6 Fish: commodity balances by region and scenario

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|---|------------------------|----------------|------|------|------|------|------|------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Production | 33 | 35 | 35 | 35 | 36 | 36 | 36 | 110 | 110 | 111 |
| | Food | 34 | 32 | 29 | 29 | 29 | 22 | 30 | 87 | 67 | 90 |
| | Feed | 5 | 5 | 5 | 6 | 5 | 4 | 5 | 83 | 77 | 86 |
| | Other uses | 2 | 6 | 6 | 6 | 6 | 6 | 7 | 402 | 385 | 415 |
| | Net trade | -8 | -8 | -5 | -6 | -4 | 3 | -6 | 51 | - | 68 |
| | Self-sufficiency ratio | 0.80 | 0.82 | 0.88 | 0.84 | 0.90 | 1.09 | 0.87 | 112 | 136 | 108 |
| East Asia and Pacific | Production | 104 | 136 | 138 | 136 | 149 | 152 | 150 | 143 | 146 | 144 |
| | Food | 80 | 91 | 92 | 84 | 84 | 82 | 82 | 105 | 102 | 103 |
| | Feed | 11 | 18 | 17 | 25 | 19 | 20 | 21 | 174 | 186 | 198 |
| | Other uses | 10 | 13 | 13 | 13 | 15 | 16 | 16 | 156 | 168 | 164 |
| | Net trade | 3 | 14 | 15 | 14 | 31 | 33 | 30 | 927 | 986 | 898 |
| | Self-sufficiency ratio | 1.03 | 1.12 | 1.12 | 1.12 | 1.27 | 1.28 | 1.25 | 123 | 124 | 121 |
| China | Production | 69 | 97 | 97 | 97 | 108 | 109 | 108 | 157 | 158 | 157 |
| | Food | 60 | 64 | 63 | 58 | 56 | 51 | 55 | 94 | 86 | 92 |
| | Feed | 9 | 12 | 12 | 18 | 11 | 11 | 13 | 133 | 133 | 146 |
| | Other uses | 3 | 2 | 2 | 2 | 3 | 3 | 3 | 104 | 109 | 111 |
| | Net trade | -2 | 18 | 20 | 18 | 38 | 43 | 38 | - | - | - |
| | Self-sufficiency ratio | 0.98 | 1.22 | 1.26 | 1.23 | 1.55 | 1.66 | 1.55 | 158 | 170 | 158 |
| East Asia and Pacific (excluding China) | Production | 35 | 39 | 40 | 39 | 41 | 43 | 41 | 118 | 122 | 118 |
| | Food | 21 | 27 | 29 | 25 | 28 | 31 | 28 | 136 | 148 | 133 |
| | Feed | 2 | 5 | 5 | 7 | 7 | 9 | 9 | 331 | 395 | 396 |
| | Other uses | 7 | 11 | 11 | 11 | 12 | 13 | 13 | 175 | 190 | 183 |
| | Net trade | 5 | -3 | -5 | -4 | -7 | -10 | -8 | - | - | - |
| | Self-sufficiency ratio | 1.17 | 0.92 | 0.88 | 0.92 | 0.86 | 0.81 | 0.84 | 74 | 70 | 72 |
| South Asia | Production | 12 | 18 | 18 | 18 | 22 | 21 | 22 | 175 | 171 | 176 |
| | Food | 10 | 14 | 15 | 13 | 14 | 15 | 15 | 138 | 144 | 139 |
| | Feed | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 229 | 313 | 241 |
| | Other uses | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 175 | 193 | 190 |
| | Net trade | 1 | 3 | 1 | 3 | 6 | 4 | 5 | 524 | 370 | 512 |
| | Self-sufficiency ratio | 1.09 | 1.18 | 1.09 | 1.19 | 1.34 | 1.23 | 1.33 | 123 | 112 | 122 |
| Europe and Central Asia | Production | 6 | 7 | 7 | 7 | 9 | 8 | 9 | 163 | 154 | 163 |
| | Food | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 77 | 76 | 76 |
| | Feed | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 115 | 131 | 128 |
| | Other uses | -1 | 0 | 0 | 0 | 0 | 0 | 0 | -5 | -5 | -6 |
| | Net trade | 0 | 1 | 1 | 1 | 4 | 3 | 4 | - | - | - |
| | Self-sufficiency ratio | 0.98 | 1.21 | 1.13 | 1.22 | 1.74 | 1.60 | 1.71 | 177 | 162 | 174 |

Table S 1.6 Fish: commodity balances by region and scenario (continued)

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|--|------------------------|----------------|------|------|------|------|------|------|-------------------|-------|-------|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Production | 14 | 14 | 15 | 14 | 13 | 16 | 13 | 93 | 107 | 93 |
| | Food | 6 | 6 | 7 | 5 | 6 | 6 | 6 | 105 | 106 | 101 |
| | Feed | 1 | 2 | 2 | 3 | 4 | 5 | 7 | 488 | 623 | 936 |
| | Other uses | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 53 | 68 | 114 |
| | Net trade | 7 | 5 | 6 | 5 | 3 | 4 | 0 | 47 | 60 | - |
| | Self-sufficiency ratio | 1.95 | 1.64 | 1.66 | 1.61 | 1.33 | 1.37 | 0.98 | 68 | 71 | 50 |
| Near East and North Africa | Production | 4 | 5 | 5 | 5 | 6 | 6 | 6 | 146 | 147 | 147 |
| | Food | 4 | 5 | 5 | 5 | 6 | 5 | 6 | 154 | 135 | 158 |
| | Feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 105 | 123 | 111 |
| | Other uses | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -2 | -2 | -3 |
| | Net trade | 0 | -1 | -1 | 0 | -1 | 0 | -1 | - | 4 577 | - |
| | Self-sufficiency ratio | 1.00 | 0.90 | 0.90 | 0.92 | 0.90 | 1.02 | 0.88 | 90 | 102 | 88 |
| Sub-Saharan Africa | Production | 6 | 6 | 6 | 6 | 6 | 7 | 6 | 104 | 113 | 104 |
| | Food | 9 | 16 | 19 | 15 | 27 | 30 | 23 | 296 | 319 | 248 |
| | Feed | 1 | 5 | 5 | 8 | 18 | 25 | 16 | 1 590 | 2 200 | 1 424 |
| | Other uses | -1 | 0 | 0 | 0 | 0 | 0 | 0 | -36 | -39 | -34 |
| | Net trade | -3 | -15 | -18 | -17 | -39 | -48 | -33 | 1 205 | 1 466 | 1 012 |
| | Self-sufficiency ratio | 0.65 | 0.29 | 0.26 | 0.27 | 0.14 | 0.13 | 0.16 | 21 | 19 | 25 |
| Low- and middle-income countries | Production | 146 | 186 | 189 | 186 | 205 | 209 | 206 | 140 | 143 | 141 |
| | Food | 115 | 137 | 143 | 127 | 142 | 142 | 136 | 124 | 124 | 118 |
| | Feed | 14 | 27 | 26 | 38 | 42 | 52 | 47 | 298 | 366 | 327 |
| | Other uses | 9 | 14 | 15 | 15 | 16 | 18 | 18 | 184 | 200 | 200 |
| | Net trade | 8 | 8 | 5 | 6 | 4 | -3 | 6 | 51 | - | 68 |
| | Self-sufficiency ratio | 1.06 | 1.04 | 1.02 | 1.04 | 1.02 | 0.99 | 1.03 | 96 | 93 | 97 |
| Low- and middle-income countries (excluding China) | Production | 77 | 89 | 91 | 89 | 97 | 100 | 97 | 126 | 130 | 126 |
| | Food | 55 | 73 | 80 | 69 | 86 | 91 | 81 | 156 | 164 | 146 |
| | Feed | 6 | 14 | 14 | 20 | 31 | 41 | 34 | 546 | 718 | 600 |
| | Other uses | 6 | 12 | 12 | 12 | 14 | 15 | 15 | 216 | 236 | 235 |
| | Net trade | 10 | -10 | -16 | -12 | -34 | -46 | -33 | - | - | - |
| | Self-sufficiency ratio | 1.14 | 0.90 | 0.85 | 0.88 | 0.74 | 0.68 | 0.75 | 65 | 60 | 65 |
| World | Production | 179 | 221 | 223 | 221 | 241 | 245 | 242 | 135 | 137 | 135 |
| | Food | 149 | 169 | 172 | 156 | 171 | 165 | 166 | 115 | 111 | 112 |
| | Feed | 20 | 32 | 31 | 44 | 47 | 56 | 51 | 238 | 286 | 260 |
| | Other uses | 11 | 20 | 21 | 21 | 23 | 24 | 24 | 217 | 228 | 232 |
| | Net trade | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 100 | 100 | 100 |

Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food, feed and for "other uses". "Other uses" in the table refers to the sum of food losses, non-food processing, and other demand. Positive (negative) net trade denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic absorption.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Oilseeds

More than 90 percent of the world's oilseeds are crushed to produce vegetable oils and oilcakes. Hence, oilseed production depends on the vegetable oil markets, which in turn depend on demand for food and biofuels. The direct use of oilseeds as animal feed or as food – that is, sunflower or sesame seeds directly eaten as food – is currently limited to less than 15 percent of global production as shown for year 2012 in [Table S 1.7](#). Other uses of oilseeds refer to food processing (crushing), post-harvest losses and to other industrial uses (e.g. producing cosmetics, medicines etc.). Currently HIC and LAC are the predominant regions in the production of oilseeds, accounting for 28 and 27 percent respectively of global production.

■ **BAU:** The BAU scenario projects an increase in world oilseed production of 50 percent by 2050, occurring broadly similarly across regions, except in SSA (68 percent) and NNA (not more than 20 percent), as can be seen in [Figure S 1.7](#) and [Table S 1.7](#). The share of oilseeds destined for direct food and feed consumption is projected to remain close to historical levels throughout the whole projection period, reaching 16 percent of total absorption in 2050. The largest oilseed share will continue to be destined to crushing for the production of vegetable oils, as highlighted by the large share of “other uses” in [Table S 1.7](#).⁵ Rise in demand for oilseeds for crushing by 2050, compared to 2012, is expected to be broadly similar across regions at rates ranging between 41 and 53 percent, except for NNA (where is projected to double) and EAP excluding China (63 percent). The increase in oilseed demand in the latter two regions – outstripping increases in production – leads to lower self-sufficiency ratios: between 2012 and 2050, NNA drops from 0.36 to 0.21 and EAP (excluding China) from 0.92 to 0.86. China remains a net importer until 2050, with a self-sufficiency ratio slightly above 0.50 for the whole period; while SSA, switches its trade position to net importer with its self-sufficiency ratio dropping from 1.04 in 2012 to 0.93 in 2050. Both LAC and HIC consolidate their position as net exporters.⁶

■ **TSS:** In the TSS scenario, a more sustainable consumption pathway implies a less dynamic demand for food (including vegetable oils), a reduction of food losses and waste, and a decrease in the production of “first generation” biodiesel. These factors translate into a global aggregate rise in demand for oilseeds of only 40 percent between 2012 and 2050 (compared to 50 percent in BAU). International trade plays a smaller role in general. Net exports from HIC and LAC by 2050 are lower than in BAU, while China and SSA reduce their imports. The only importing regions where the self-sufficiency ratio decreases compared to BAU are SAS and – to a much lesser extent – LAC, NNA and EAP (excluding China). This is due to more sustainable agricultural practices (including limited water withdrawals) and competing uses of relatively scarce land limiting the domestic production of oilseeds.

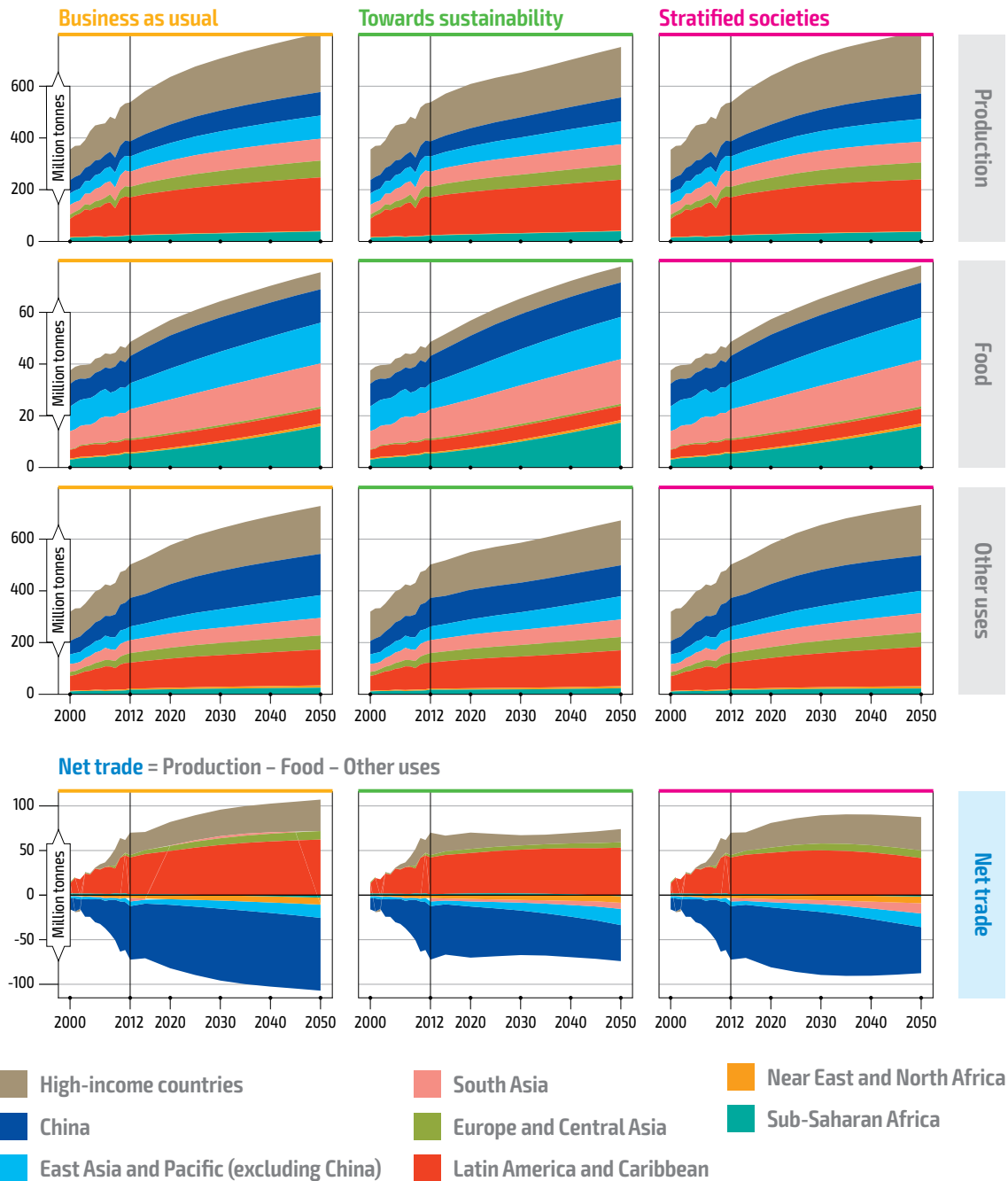
■ **SSS:** The SSS scenario, unlike TSS, leads to higher global production levels compared to BAU, and especially in HIC and China, which by 2050 increase their production by 59 and 67 percent respectively, compared to 51 and 55 percent respectively in BAU.

⁵ Projections on the food consumption of vegetable oils preceded in Section 4.5 of the report.

⁶ The item “other uses” in the commodity balance for oilseeds includes oilseeds destined to “first generation” biodiesel production. As explained in Section 3.6 of the report, demand for first generation biofuels does not expand more after 2026.

This however, does not directly translate into more food availability, particularly for SSA and SAS, as direct use of oilseeds as food remains almost unchanged compared to BAU, while post-harvest losses increase and oilseed demand for vegetable oil production remains almost unchanged compared to BAU.

Figure S 1.7 Commodity balances for oilseeds by region and scenario



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: food processing (crushing of oilseeds), food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports). "Oilseeds" comprises: coconuts, cottonseed, groundnuts, palm kernels, rapeseed, sesame seed, soybeans, sunflower seed and other oilseeds.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAP5 model.

Table S 1.7 Oilseeds: commodity balances by region and scenario

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|---|------------------------|----------------|------|------|------|------|------|------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Production | 151 | 201 | 172 | 212 | 227 | 195 | 239 | 151 | 129 | 159 |
| | Food | 5 | 6 | 6 | 6 | 7 | 6 | 7 | 120 | 112 | 122 |
| | Feed | 8 | 12 | 8 | 13 | 12 | 8 | 10 | 145 | 93 | 125 |
| | Other uses | 112 | 153 | 146 | 161 | 173 | 166 | 185 | 155 | 149 | 166 |
| | Net trade | 25 | 30 | 11 | 32 | 35 | 15 | 37 | 140 | 59 | 149 |
| | Self-sufficiency ratio | 1.20 | 1.17 | 1.07 | 1.18 | 1.18 | 1.08 | 1.19 | 99 | 90 | 99 |
| East Asia and Pacific | Production | 117 | 157 | 152 | 159 | 180 | 181 | 186 | 154 | 154 | 159 |
| | Food | 21 | 27 | 27 | 27 | 29 | 30 | 30 | 139 | 144 | 145 |
| | Feed | 14 | 23 | 18 | 26 | 24 | 18 | 22 | 175 | 129 | 160 |
| | Other uses | 148 | 197 | 165 | 185 | 224 | 192 | 201 | 151 | 130 | 136 |
| | Net trade | -65 | -90 | -59 | -79 | -96 | -59 | -67 | 148 | 90 | 103 |
| | Self-sufficiency ratio | 0.64 | 0.64 | 0.72 | 0.67 | 0.65 | 0.76 | 0.74 | 101 | 118 | 114 |
| China | Production | 59 | 81 | 78 | 83 | 91 | 93 | 98 | 155 | 158 | 167 |
| | Food | 10 | 13 | 14 | 13 | 13 | 13 | 13 | 123 | 127 | 129 |
| | Feed | 14 | 22 | 17 | 25 | 23 | 17 | 21 | 170 | 125 | 155 |
| | Other uses | 95 | 126 | 97 | 115 | 137 | 103 | 115 | 144 | 109 | 122 |
| | Net trade | -60 | -81 | -50 | -71 | -82 | -40 | -52 | 136 | 67 | 86 |
| | Self-sufficiency ratio | 0.49 | 0.50 | 0.61 | 0.54 | 0.53 | 0.70 | 0.65 | 107 | 141 | 132 |
| East Asia and Pacific (excluding China) | Production | 59 | 76 | 74 | 76 | 89 | 89 | 88 | 152 | 151 | 150 |
| | Food | 10 | 14 | 14 | 14 | 16 | 16 | 16 | 156 | 162 | 162 |
| | Feed | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 508 | 432 | 502 |
| | Other uses | 54 | 71 | 68 | 70 | 87 | 89 | 86 | 163 | 167 | 161 |
| | Net trade | -5 | -9 | -9 | -9 | -15 | -18 | -15 | 285 | 351 | 294 |
| | Self-sufficiency ratio | 0.92 | 0.89 | 0.89 | 0.90 | 0.86 | 0.83 | 0.85 | 93 | 90 | 93 |
| South Asia | Production | 58 | 76 | 70 | 74 | 84 | 78 | 80 | 145 | 134 | 137 |
| | Food | 11 | 15 | 15 | 15 | 17 | 17 | 18 | 147 | 152 | 159 |
| | Feed | 5 | 4 | 3 | 4 | 4 | 3 | 3 | 75 | 51 | 59 |
| | Other uses | 46 | 55 | 55 | 60 | 64 | 65 | 70 | 139 | 142 | 154 |
| | Net trade | -4 | 2 | -3 | -5 | 0 | -7 | -11 | 4 | 173 | 286 |
| | Self-sufficiency ratio | 0.94 | 1.03 | 0.96 | 0.94 | 1.00 | 0.92 | 0.88 | 107 | 98 | 93 |
| Europe and Central Asia | Production | 40 | 55 | 50 | 56 | 65 | 58 | 66 | 161 | 145 | 163 |
| | Food | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 119 | 121 | 131 |
| | Feed | 4 | 6 | 5 | 7 | 7 | 7 | 7 | 193 | 176 | 191 |
| | Other uses | 33 | 41 | 40 | 41 | 47 | 45 | 49 | 142 | 135 | 148 |
| | Net trade | 3 | 8 | 5 | 8 | 10 | 6 | 9 | 374 | 239 | 334 |
| | Self-sufficiency ratio | 1.07 | 1.16 | 1.11 | 1.16 | 1.17 | 1.12 | 1.15 | 110 | 105 | 108 |

Table S.1.7 Oilseeds: commodity balances by region and scenario (continued)

| REGIONS | BALANCE ITEMS | million tonnes | | | | | | | index, 2012 = 100 | | |
|--|------------------------|----------------|------|------|------|------|------|------|-------------------|------|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Production | 146 | 184 | 175 | 187 | 207 | 197 | 200 | 142 | 135 | 137 |
| | Food | 5 | 5 | 5 | 5 | 6 | 5 | 6 | 123 | 117 | 123 |
| | Feed | 3 | 5 | 4 | 6 | 7 | 8 | 10 | 243 | 252 | 346 |
| | Other uses | 97 | 117 | 116 | 125 | 132 | 131 | 142 | 136 | 135 | 147 |
| | Net trade | 41 | 56 | 49 | 50 | 62 | 53 | 42 | 150 | 128 | 100 |
| | Self-sufficiency ratio | 1.40 | 1.44 | 1.39 | 1.37 | 1.43 | 1.37 | 1.26 | 102 | 98 | 90 |
| Near East and North Africa | Production | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 116 | 96 | 116 |
| | Food | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 199 | 198 | 210 |
| | Feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 113 | 111 | 96 |
| | Other uses | 4 | 7 | 6 | 7 | 9 | 8 | 8 | 201 | 185 | 194 |
| | Net trade | -3 | -6 | -5 | -6 | -8 | -7 | -8 | 248 | 236 | 241 |
| | Self-sufficiency ratio | 0.36 | 0.25 | 0.25 | 0.26 | 0.21 | 0.18 | 0.21 | 58 | 52 | 59 |
| Sub-Saharan Africa | Production | 23 | 31 | 31 | 31 | 39 | 40 | 38 | 168 | 172 | 162 |
| | Food | 5 | 10 | 10 | 10 | 16 | 17 | 16 | 300 | 326 | 299 |
| | Feed | 0 | 1 | 1 | 1 | 3 | 4 | 3 | 853 | 1082 | 872 |
| | Other uses | 17 | 21 | 18 | 20 | 23 | 20 | 20 | 136 | 119 | 121 |
| | Net trade | 1 | 0 | 2 | 0 | -3 | -1 | -2 | - | - | - |
| | Self-sufficiency ratio | 1.04 | 0.99 | 1.07 | 1.01 | 0.93 | 0.97 | 0.96 | 90 | 94 | 92 |
| Low- and middle-income countries | Production | 387 | 506 | 480 | 510 | 577 | 557 | 572 | 149 | 144 | 148 |
| | Food | 43 | 58 | 59 | 59 | 69 | 72 | 71 | 160 | 166 | 166 |
| | Feed | 26 | 39 | 31 | 44 | 46 | 39 | 46 | 175 | 148 | 175 |
| | Other uses | 345 | 439 | 401 | 439 | 498 | 461 | 492 | 144 | 134 | 142 |
| | Net trade | -28 | -30 | -11 | -32 | -35 | -15 | -37 | 128 | 54 | 136 |
| | Self-sufficiency ratio | 0.93 | 0.94 | 0.98 | 0.94 | 0.94 | 0.97 | 0.94 | 101 | 104 | 101 |
| Low- and middle-income countries (excluding China) | Production | 328 | 425 | 402 | 427 | 487 | 464 | 474 | 148 | 141 | 144 |
| | Food | 33 | 45 | 46 | 46 | 56 | 58 | 58 | 172 | 178 | 178 |
| | Feed | 13 | 17 | 14 | 19 | 23 | 22 | 25 | 180 | 172 | 198 |
| | Other uses | 251 | 313 | 304 | 324 | 362 | 359 | 377 | 144 | 143 | 150 |
| | Net trade | 33 | 51 | 38 | 39 | 46 | 26 | 14 | 142 | 79 | 44 |
| | Self-sufficiency ratio | 1.11 | 1.14 | 1.11 | 1.10 | 1.11 | 1.06 | 1.03 | 100 | 95 | 93 |
| World | Production | 538 | 707 | 652 | 722 | 805 | 752 | 811 | 150 | 140 | 151 |
| | Food | 49 | 64 | 65 | 65 | 75 | 78 | 78 | 155 | 160 | 161 |
| | Feed | 34 | 51 | 40 | 57 | 58 | 46 | 56 | 168 | 135 | 163 |
| | Other uses | 455 | 592 | 547 | 600 | 672 | 628 | 677 | 148 | 138 | 149 |
| | Net trade | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 100 | 100 | 100 |

Notes: Net trade is calculated as domestic production - aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Oilseeds" comprises: coconuts, cottonseed, groundnuts, palm kernels, rapeseed, sesame seed, soybeans, sunflower seed and other oilseeds. "Other uses" refers to the sum of all other domestic uses, including: food processing (crushing of oilseeds), food losses, non-food processing and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Cash crops

Cash crops include cocoa, coffee, cotton, rubber, tea, tobacco and other crop fibres. Most of the world's cash crops – more than 90 percent – are produced in LMIC (see [Figure S 1.8](#) and [Table S 1.8](#)). In 2012, China, SAS, and EAP each accounted for about 20 percent of global cash crop production, followed by LAC (16 percent) and SSA (10 percent). China, despite its large share in the global production of cash crops, is historically a net importer. Globally, food uses of cash crops account for a limited share of total absorption (less than 27 percent in 2012). Feed uses are almost non-existent. Coffee and tea are typically exported by LMIC to HIC. The item “other uses” for cash crops includes fibres used in the textile industry, especially in HIC, SAS and EAP, and other industrial uses (see [Table S 1.8](#)).

■ **BAU:** Under the BAU scenario, global cash crop production is projected to increase by about 44 percent by 2050 compared with 2012. The bulk of these commodities will continue to be produced in LMIC, as [Table S 1.8](#) suggests. In China, production is projected to increase by 54 percent in 2050, prompting China's share of global production to rise to almost 22 percent by 2050, from 20 percent in 2012. In LMIC (excluding China) cash crop production is projected to increase in 2050 by slightly more than 40 percent. NNA and ECA will lag behind with a growth of 22 and 30 percent respectively by 2050.

Globally, food uses of cash crops are projected to grow between 2012 and 2050 by 30 percent; that is at a slower pace than other (industrial) uses, projected to grow at 48 percent. In LMIC (excluding China) the growth of both absorption items is broadly balanced (52 and 56 percent respectively). Conversely, diverging growth patterns between these two categories are particularly marked in HIC, where food uses will only grow 11 percent compared to 47 percent of other (industrial) uses, and China (6.7 and 38 percent, respectively). Sub-Saharan Africa is the only region where food uses grow more than other (industrial) uses, by 158 and 83 percent, respectively.

In BAU, by 2050 all regions maintain their net trade position, except SAS, which shifts from net exporter – with a self-sufficiency ratio of 1.16 – to net importer, albeit with a self-sufficiency ratio very close to 1. However, EAP (excluding China) and SSA, which in 2012 show a self-sufficiency ratio of 2.15 and 2.49 respectively, will have a lower ratio by 2050 (at 1.88 and 1.62 respectively) thus weakening their relative export position. By contrast, LAC will reinforce its relative export position with a ratio shifting from 1.82 in 2012 to 2.1 in 2050.

■ **TSS:** In the TSS scenario – built upon the assumption that cultivation practices associated with lower yields are adopted and natural resources are used more sustainably – cash crop production in 2050 grows by 39 percent, compared with 44 percent in BAU. However, global figures hide significant variations across regions. In SAS and NNA the growth between 2012 and 2050 in TSS is markedly lower than in BAU (29 and 3.8 percent respectively in TSS, compared with 47 and 22 percent respectively in BAU). By contrast, in SSA and LAC, production growth between 2012 and 2050 is higher in TSS than in BAU (47 and 45 percent respectively in TSS, compared with 41 and 40 percent respectively in BAU). This is essentially due to the different natural resource constraints faced by the different regions that, while allowing cash crops to expand in LAC and SSA, limit their growth in SAS and NNA.

In TSS, globally, the two items of domestic absorption of cash crops – notably food uses and other (industrial) uses – grow in a more balanced way between 2012 and

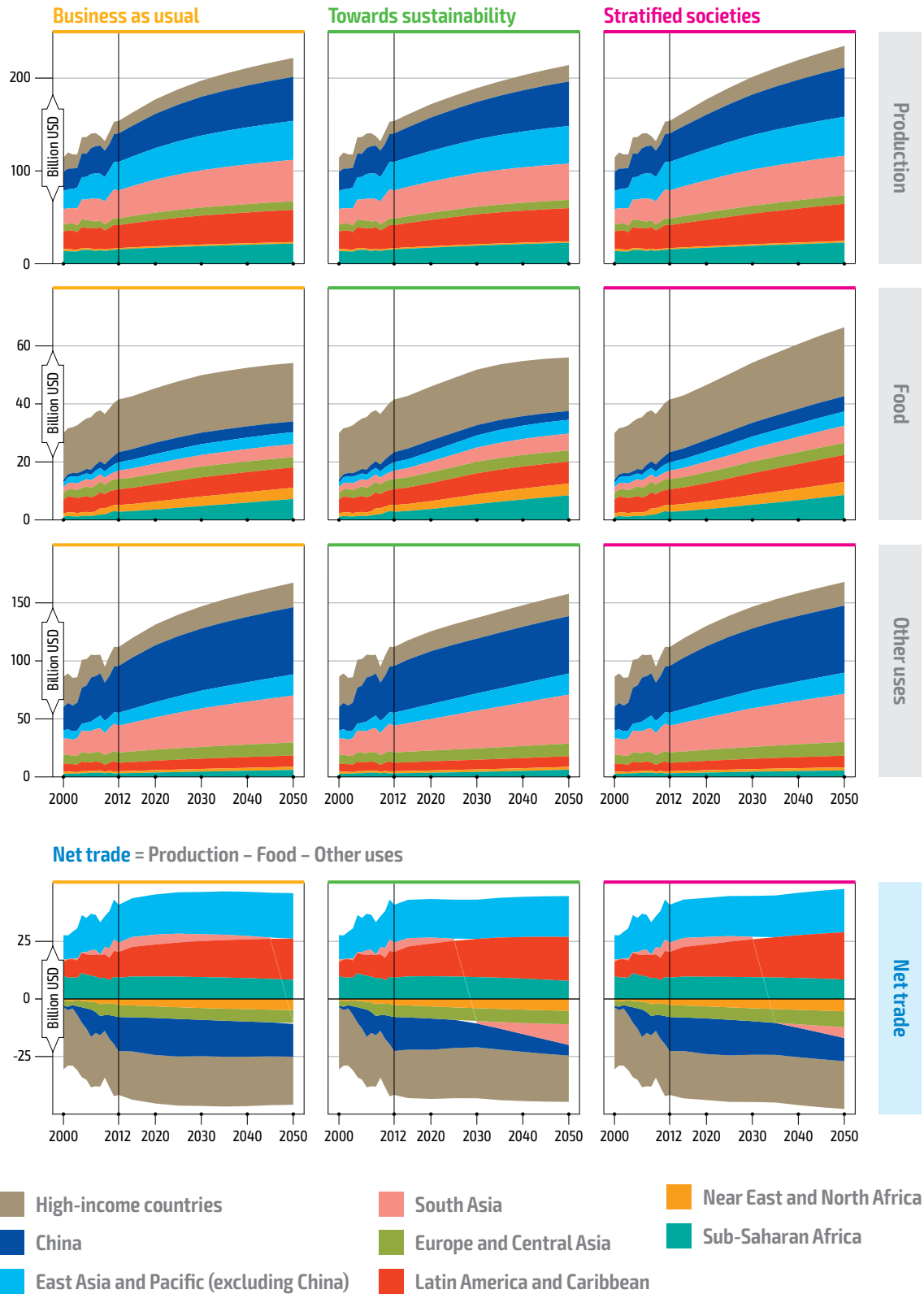
2050 than in BAU, with food uses gaining relative prominence over industrial uses. This is particularly marked in regions such as SAS, SSA and NNA – and, to a lesser extent, EAP (excluding China) – which see larger per capita income under TSS compared to BAU. This extra income favours the expansion of food consumption.

In TSS, by 2050 all regions maintain their historical trade position, except for SAS, which becomes a significant net importer, due to restricted expansion of domestic production linked to the limits in natural resource use. China, thanks to a marked reduction of other (industrial) uses of cash crops compared to BAU, increases its self-sufficiency ratio in 2050 from 0.77 in BAU to 0.91 in TSS.

■ **SSS:** The SSS scenario, on the other hand, projects higher global production growth of cash crops against BAU. This is due to higher economic growth patterns in almost all regions except SSA and looser constraints on the overuse of natural resources, albeit with significant regional differences, also influenced by the differentiated impact of climate change on crop yields (more pronounced in SSS than in BAU). At the global level, between 2012 and 2050 the production of cash crops is projected to increase by 53 percent, compared to 44 percent in BAU. The highest increase is projected to take place in HIC and China (with the same growth of 73 percent by 2050) and in LAC (61 percent by 2050), thanks to more investment in technologies and infrastructure which allow comparatively higher, though not sustainable, crop yields. Sub-Saharan Africa, NNA, ECA and EAP (excluding China), experience a growth pattern by 2050 broadly similar to BAU. South-Asia instead reveals lower growth by 2050 in SSS than in BAU (41 and 47 percent, respectively).

In SSS, by 2050, the self-sufficiency ratio of HIC and China increases compared to BAU, while it decreases in all other regions.

Figure S 1.8 Commodity balances for cash crops by region and scenario, 2012 exchange rates



Notes: Net trade is calculated as domestic production net of domestic absorption, that is, the sum of demand for food and for "other uses". "Other uses" in the figure refers to the sum of non-food domestic uses, including: feed, seed, food losses, non-food processing and other demand. Positive (negative) net trade denotes net exports (imports). "Cash crops" comprises: cocoa, coffee, cotton, rubber, tea, tobacco and other crop fibres.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 1.8 Cash crops: commodity balances by region and scenario

| REGIONS | BALANCE ITEMS | billion USD, 2012 exchange rates | | | | | | | index, 2012 = 100 | | |
|---|------------------------|----------------------------------|------|------|------|------|------|------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Production | 14 | 17 | 15 | 19 | 20 | 18 | 23 | 151 | 131 | 173 |
| | Food | 18 | 20 | 19 | 21 | 20 | 18 | 24 | 111 | 102 | 131 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 14 | 19 | 18 | 19 | 21 | 19 | 20 | 147 | 134 | 141 |
| | Net trade | -19 | -22 | -22 | -20 | -21 | -20 | -21 | 109 | 105 | 109 |
| | Self-sufficiency ratio | 0.42 | 0.45 | 0.40 | 0.48 | 0.49 | 0.47 | 0.53 | 119 | 113 | 128 |
| East Asia and Pacific | Production | 61 | 79 | 77 | 81 | 89 | 89 | 95 | 146 | 144 | 155 |
| | Food | 6 | 8 | 8 | 9 | 8 | 8 | 10 | 123 | 123 | 161 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 53 | 69 | 62 | 69 | 76 | 68 | 76 | 143 | 127 | 143 |
| | Net trade | 2 | 3 | 7 | 3 | 5 | 13 | 9 | 337 | 806 | 536 |
| | Self-sufficiency ratio | 1.03 | 1.03 | 1.10 | 1.04 | 1.07 | 1.17 | 1.10 | 104 | 114 | 107 |
| China | Production | 31 | 42 | 40 | 44 | 47 | 48 | 53 | 154 | 156 | 173 |
| | Food | 3 | 4 | 4 | 5 | 4 | 3 | 5 | 107 | 87 | 152 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 42 | 54 | 47 | 54 | 58 | 49 | 58 | 138 | 118 | 138 |
| | Net trade | -15 | -16 | -10 | -15 | -14 | -5 | -10 | 96 | 31 | 68 |
| | Self-sufficiency ratio | 0.68 | 0.73 | 0.80 | 0.75 | 0.77 | 0.91 | 0.84 | 114 | 135 | 124 |
| East Asia and Pacific (excluding China) | Production | 31 | 37 | 36 | 37 | 42 | 41 | 42 | 137 | 133 | 137 |
| | Food | 3 | 4 | 4 | 4 | 4 | 5 | 5 | 143 | 165 | 171 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 11 | 15 | 15 | 15 | 18 | 18 | 18 | 159 | 159 | 161 |
| | Net trade | 16 | 18 | 17 | 18 | 20 | 18 | 19 | 120 | 108 | 115 |
| | Self-sufficiency ratio | 2.15 | 1.96 | 1.89 | 1.92 | 1.88 | 1.77 | 1.81 | 88 | 83 | 84 |
| South Asia | Production | 30 | 40 | 36 | 39 | 44 | 39 | 43 | 147 | 129 | 141 |
| | Food | 3 | 4 | 5 | 5 | 4 | 6 | 6 | 153 | 198 | 201 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 23 | 33 | 33 | 33 | 40 | 42 | 41 | 174 | 182 | 178 |
| | Net trade | 4 | 3 | -1 | 1 | 0 | -9 | -5 | - | - | - |
| | Self-sufficiency ratio | 1.16 | 1.08 | 0.97 | 1.03 | 0.99 | 0.81 | 0.90 | 86 | 70 | 78 |
| Europe and Central Asia | Production | 7 | 9 | 8 | 9 | 9 | 9 | 9 | 130 | 124 | 128 |
| | Food | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 102 | 110 | 120 |
| | Feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 27 | 11 |
| | Other uses | 9 | 10 | 10 | 10 | 11 | 11 | 12 | 129 | 124 | 135 |
| | Net trade | -5 | -5 | -6 | -6 | -6 | -6 | -7 | 108 | 114 | 135 |
| | Self-sufficiency ratio | 0.58 | 0.63 | 0.59 | 0.60 | 0.63 | 0.60 | 0.57 | 107 | 103 | 98 |

Table S 1.8 Cash crops: commodity balances by region and scenario (continued)

| REGIONS | BALANCE ITEMS | billion USD, 2012 exchange rates | | | | | | | index, 2012 = 100 | | |
|--|------------------------|----------------------------------|------|------|------|------|------|------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Production | 25 | 31 | 32 | 33 | 35 | 36 | 40 | 140 | 145 | 161 |
| | Food | 5 | 7 | 7 | 7 | 7 | 8 | 9 | 129 | 138 | 170 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 8 | 9 | 8 | 9 | 10 | 9 | 10 | 119 | 113 | 124 |
| | Net trade | 11 | 16 | 17 | 16 | 18 | 19 | 21 | 161 | 171 | 185 |
| | Self-sufficiency ratio | 1.82 | 2.01 | 2.06 | 2.00 | 2.07 | 2.14 | 2.06 | 114 | 118 | 113 |
| Near East and North Africa | Production | 1 | 2 | 2 | 2 | 2 | 1 | 2 | 122 | 104 | 133 |
| | Food | 2 | 3 | 3 | 3 | 4 | 4 | 5 | 165 | 175 | 194 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 1.8 | 2.3 | 2.2 | 2.3 | 3 | 3 | 3 | 151 | 141 | 150 |
| | Net trade | -3 | -4 | -4 | -4 | -5 | -5 | -5 | 178 | 189 | 197 |
| | Self-sufficiency ratio | 0.34 | 0.30 | 0.27 | 0.30 | 0.26 | 0.22 | 0.26 | 77 | 65 | 76 |
| Sub-Saharan Africa | Production | 15 | 19 | 20 | 19 | 22 | 23 | 23 | 141 | 147 | 148 |
| | Food | 3 | 5 | 5 | 5 | 7 | 8 | 9 | 258 | 301 | 307 |
| | Feed | 0 | - | - | - | - | - | - | - | - | - |
| | Other uses | 3 | 5 | 5 | 5 | 6 | 6 | 6 | 183 | 187 | 171 |
| | Net trade | 9 | 9 | 9 | 9 | 8 | 8 | 8 | 90 | 85 | 91 |
| | Self-sufficiency ratio | 2.49 | 2.00 | 1.95 | 1.96 | 1.62 | 1.53 | 1.59 | 65 | 61 | 64 |
| Low- and middle-income countries | Production | 140 | 180 | 174 | 182 | 201 | 196 | 211 | 143 | 140 | 151 |
| | Food | 23 | 30 | 33 | 34 | 34 | 38 | 43 | 145 | 161 | 183 |
| | Feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 27 | 11 |
| | Other uses | 99 | 128 | 120 | 128 | 146 | 139 | 148 | 148 | 141 | 150 |
| | Net trade | 18 | 22 | 22 | 20 | 21 | 20 | 21 | 114 | 110 | 113 |
| | Self-sufficiency ratio | 1.15 | 1.14 | 1.15 | 1.13 | 1.12 | 1.11 | 1.11 | 97 | 97 | 96 |
| Low- and middle-income countries (excluding China) | Production | 110 | 138 | 134 | 139 | 154 | 148 | 158 | 140 | 135 | 144 |
| | Food | 20 | 26 | 29 | 29 | 30 | 35 | 37 | 152 | 174 | 188 |
| | Feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 27 | 11 |
| | Other uses | 57 | 75 | 72 | 75 | 89 | 89 | 90 | 156 | 157 | 159 |
| | Net trade | 33 | 37 | 32 | 35 | 35 | 25 | 31 | 106 | 75 | 93 |
| | Self-sufficiency ratio | 1.43 | 1.37 | 1.32 | 1.34 | 1.30 | 1.20 | 1.24 | 91 | 84 | 87 |
| World | Production | 154 | 197 | 189 | 201 | 222 | 214 | 235 | 144 | 139 | 153 |
| | Food | 42 | 50 | 52 | 54 | 54 | 56 | 66 | 130 | 135 | 160 |
| | Feed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41 | 27 | 11 |
| | Other uses | 112 | 147 | 137 | 147 | 168 | 158 | 168 | 149 | 141 | 150 |
| | Net trade | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 100 | 100 | 100 |

Notes: Net trade is calculated as domestic production - aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Cash crops" comprises: cocoa, coffee, cotton, rubber, tea, tobacco and other crop fibres. "Other uses" refers to the sum of all other domestic uses, including: seed, food losses, processing and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

2 | Statistical tables

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region

| REGIONS | CROPS | | YIELD | TECHNOLOGY (index, 2012 = 100) | | | | | | CLIMATE (index, 2012 = 100) | | | | | |
|-----------------------|------------|-----------|-----------|--------------------------------|-----|-----|------|-----|-----|-----------------------------|-----|-----|------|-----|-----|
| | | | 2012 | 2030 | | | 2050 | | | 2030 | | | 2050 | | |
| | | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | All | RAINFED | 5.28 | 112 | 72 | 112 | 121 | 77 | 121 | 101 | 100 | 99 | 102 | 100 | 98 |
| | | IRRIGATED | 9.99 | 110 | 70 | 110 | 117 | 75 | 117 | 101 | 101 | 101 | 103 | 102 | 102 |
| | Vegetables | RAINFED | 25.45 | 115 | 92 | 115 | 126 | 100 | 126 | 100 | 99 | 98 | 101 | 99 | 96 |
| | | IRRIGATED | 34.44 | 115 | 92 | 115 | 125 | 100 | 125 | 100 | 99 | 99 | 100 | 99 | 98 |
| | Maize | RAINFED | 8.32 | 108 | 87 | 108 | 112 | 90 | 112 | 101 | 100 | 99 | 102 | 100 | 98 |
| | | IRRIGATED | 10.02 | 108 | 86 | 108 | 112 | 89 | 112 | 103 | 103 | 104 | 106 | 106 | 108 |
| | Wheat | RAINFED | 3.56 | 111 | 89 | 111 | 120 | 96 | 120 | 102 | 100 | 101 | 103 | 101 | 101 |
| | | IRRIGATED | 4.60 | 111 | 89 | 111 | 119 | 95 | 119 | 100 | 100 | 99 | 101 | 99 | 98 |
| | Soybeans | RAINFED | 2.77 | 114 | 92 | 114 | 126 | 101 | 126 | 100 | 99 | 98 | 101 | 99 | 95 |
| | | IRRIGATED | 1.95 | 119 | 96 | 119 | 133 | 106 | 133 | 100 | 100 | 100 | 99 | 101 | 100 |
| Rice | RAINFED | 4.14 | 114 | 91 | 114 | 125 | 100 | 125 | 105 | 108 | 109 | 111 | 116 | 120 | |
| | IRRIGATED | 7.29 | 109 | 87 | 109 | 116 | 93 | 116 | 101 | 101 | 101 | 101 | 101 | 101 | |
| East Asia and Pacific | All | RAINFED | 8.21 | 117 | 95 | 114 | 130 | 105 | 123 | 99 | 99 | 97 | 97 | 98 | 94 |
| | | IRRIGATED | 9.67 | 114 | 93 | 113 | 124 | 100 | 121 | 101 | 102 | 101 | 102 | 103 | 103 |
| | Vegetables | RAINFED | 18.66 | 117 | 106 | 117 | 133 | 119 | 132 | 99 | 99 | 99 | 97 | 99 | 97 |
| | | IRRIGATED | 26.91 | 117 | 105 | 117 | 132 | 118 | 131 | 100 | 101 | 100 | 100 | 102 | 100 |
| | Rice | RAINFED | 3.49 | 122 | 109 | 118 | 138 | 124 | 130 | 98 | 99 | 96 | 96 | 97 | 92 |
| | | IRRIGATED | 5.98 | 111 | 100 | 110 | 118 | 106 | 116 | 101 | 101 | 101 | 102 | 103 | 102 |
| | Maize | RAINFED | 4.67 | 118 | 106 | 116 | 130 | 117 | 127 | 102 | 101 | 102 | 103 | 103 | 104 |
| | | IRRIGATED | 6.16 | 109 | 98 | 109 | 113 | 101 | 112 | 104 | 104 | 105 | 108 | 109 | 110 |
| | Sugar cane | RAINFED | 53.84 | 117 | 105 | 115 | 128 | 115 | 122 | 96 | 98 | 96 | 92 | 96 | 92 |
| | | IRRIGATED | 73.56 | 116 | 104 | 114 | 127 | 114 | 123 | 101 | 102 | 102 | 103 | 104 | 103 |
| Palm oil | RAINFED | 18.74 | 108 | 98 | 106 | 115 | 103 | 109 | 99 | 99 | 97 | 98 | 98 | 94 | |
| | IRRIGATED | 13.49 | 100 | 90 | 100 | 101 | 90 | 101 | 102 | 102 | 101 | 104 | 105 | 102 | |

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region (continued)

| REGIONS | CROPS | | YIELD | TECHNOLOGY (index, 2012 = 100) | | | | | | CLIMATE (index, 2012 = 100) | | | | | |
|---|------------|-----------|-----------|--------------------------------|-----|-----|------|-----|-----|-----------------------------|-----|-----|------|-----|-----|
| | | | 2012 | 2030 | | | 2050 | | | 2030 | | | 2050 | | |
| | | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| China | All | RAINFED | 9.08 | 116 | 94 | 116 | 128 | 103 | 128 | 100 | 100 | 99 | 99 | 101 | 99 |
| | | IRRIGATED | 9.63 | 113 | 91 | 113 | 121 | 97 | 121 | 102 | 103 | 103 | 104 | 105 | 106 |
| | Vegetables | RAINFED | 20.53 | 116 | 105 | 116 | 131 | 118 | 131 | 99 | 100 | 99 | 98 | 100 | 98 |
| | | IRRIGATED | 28.16 | 116 | 105 | 116 | 131 | 118 | 131 | 100 | 101 | 100 | 101 | 103 | 101 |
| | Rice | IRRIGATED | 6.72 | 105 | 94 | 105 | 106 | 95 | 106 | 102 | 103 | 102 | 104 | 105 | 105 |
| | Maize | RAINFED | 5.18 | 108 | 97 | 108 | 110 | 99 | 110 | 103 | 102 | 103 | 106 | 105 | 107 |
| | | IRRIGATED | 6.25 | 108 | 97 | 108 | 110 | 99 | 110 | 104 | 104 | 105 | 108 | 109 | 110 |
| | Wheat | RAINFED | 3.92 | 114 | 103 | 114 | 119 | 107 | 119 | 98 | 99 | 96 | 96 | 98 | 92 |
| | | IRRIGATED | 5.30 | 114 | 103 | 114 | 119 | 107 | 119 | 99 | 100 | 101 | 99 | 101 | 101 |
| Potatoes | RAINFED | 14.82 | 123 | 111 | 123 | 138 | 124 | 138 | 98 | 99 | 96 | 96 | 98 | 91 | |
| | IRRIGATED | 18.85 | 123 | 111 | 123 | 138 | 124 | 138 | 100 | 99 | 99 | 99 | 98 | 98 | |
| East Asia and Pacific (excluding China) | All | RAINFED | 7.50 | 118 | 96 | 112 | 132 | 106 | 117 | 98 | 98 | 95 | 95 | 96 | 90 |
| | | IRRIGATED | 9.80 | 120 | 97 | 114 | 135 | 109 | 120 | 99 | 98 | 97 | 97 | 97 | 93 |
| | Rice | RAINFED | 3.49 | 122 | 109 | 118 | 138 | 124 | 130 | 98 | 99 | 96 | 96 | 97 | 92 |
| | | IRRIGATED | 5.06 | 122 | 110 | 119 | 139 | 125 | 131 | 100 | 99 | 99 | 100 | 98 | 99 |
| | Palm oil | RAINFED | 18.74 | 108 | 98 | 106 | 115 | 103 | 109 | 99 | 99 | 97 | 98 | 98 | 94 |
| | Vegetables | RAINFED | 9.57 | 127 | 114 | 123 | 151 | 136 | 143 | 95 | 94 | 92 | 89 | 88 | 83 |
| | | IRRIGATED | 15.13 | 126 | 113 | 122 | 150 | 135 | 142 | 97 | 97 | 98 | 93 | 93 | 95 |
| | Sugar cane | RAINFED | 52.44 | 118 | 106 | 115 | 129 | 116 | 122 | 95 | 97 | 95 | 90 | 93 | 89 |
| | | IRRIGATED | 77.45 | 117 | 105 | 113 | 128 | 115 | 121 | 98 | 98 | 95 | 95 | 96 | 89 |
| Maize | RAINFED | 4.01 | 134 | 121 | 131 | 163 | 147 | 154 | 99 | 100 | 99 | 99 | 99 | 99 | |
| | IRRIGATED | 4.58 | 135 | 122 | 132 | 166 | 149 | 156 | 102 | 100 | 103 | 104 | 100 | 107 | |
| South Asia | All | RAINFED | 2.42 | 122 | 99 | 115 | 138 | 112 | 122 | 97 | 98 | 96 | 94 | 96 | 91 |
| | | IRRIGATED | 7.04 | 122 | 99 | 115 | 140 | 113 | 122 | 98 | 97 | 94 | 95 | 93 | 88 |
| | Rice | RAINFED | 2.16 | 129 | 116 | 125 | 146 | 131 | 137 | 99 | 99 | 98 | 98 | 98 | 95 |
| | | IRRIGATED | 4.32 | 128 | 115 | 125 | 146 | 131 | 137 | 99 | 99 | 99 | 99 | 99 | 97 |
| | Wheat | RAINFED | 1.72 | 129 | 116 | 125 | 150 | 134 | 140 | 96 | 96 | 93 | 91 | 91 | 84 |
| | | IRRIGATED | 3.21 | 130 | 117 | 126 | 155 | 139 | 143 | 96 | 95 | 93 | 93 | 90 | 86 |
| | Vegetables | RAINFED | 9.38 | 119 | 107 | 115 | 134 | 121 | 126 | 97 | 97 | 94 | 94 | 93 | 87 |
| | | IRRIGATED | 17.76 | 117 | 106 | 114 | 132 | 118 | 124 | 97 | 97 | 95 | 94 | 94 | 88 |
| | Cotton | RAINFED | 1.18 | 135 | 122 | 132 | 148 | 133 | 139 | 100 | 101 | 99 | 100 | 102 | 98 |
| IRRIGATED | | 1.96 | 134 | 120 | 129 | 153 | 137 | 141 | 99 | 98 | 98 | 99 | 97 | 96 | |
| Cassava | RAINFED | 34.29 | 115 | 104 | 112 | 120 | 108 | 113 | 97 | 98 | 94 | 95 | 95 | 87 | |

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region (continued)

| REGIONS | CROPS | | YIELD | TECHNOLOGY (index, 2012 = 100) | | | | | | CLIMATE (index, 2012 = 100) | | | | | |
|-----------------------------|------------|-----------|-----------|--------------------------------|-----|-----|------|-----|-----|-----------------------------|-----|-----|------|-----|-----|
| | | | 2012 | 2030 | | | 2050 | | | 2030 | | | 2050 | | |
| | | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Europe and Central Asia | All | RAINFED | 3.36 | 128 | 94 | 127 | 145 | 106 | 142 | 101 | 100 | 98 | 102 | 99 | 96 |
| | | IRRIGATED | 7.33 | 121 | 93 | 117 | 134 | 103 | 125 | 100 | 100 | 99 | 100 | 99 | 97 |
| | Vegetables | RAINFED | 15.34 | 120 | 104 | 119 | 133 | 114 | 130 | 101 | 100 | 98 | 102 | 100 | 96 |
| | | IRRIGATED | 33.58 | 119 | 106 | 116 | 134 | 119 | 127 | 100 | 100 | 98 | 99 | 99 | 96 |
| | Wheat | RAINFED | 1.94 | 121 | 105 | 120 | 137 | 120 | 135 | 102 | 100 | 99 | 104 | 101 | 97 |
| | | IRRIGATED | 4.19 | 118 | 103 | 116 | 131 | 115 | 127 | 99 | 99 | 97 | 99 | 98 | 95 |
| | Potatoes | RAINFED | 14.68 | 123 | 105 | 123 | 141 | 120 | 141 | 101 | 101 | 98 | 102 | 103 | 95 |
| | | IRRIGATED | 21.69 | 121 | 105 | 119 | 135 | 117 | 131 | 99 | 99 | 97 | 97 | 98 | 93 |
| | Maize | RAINFED | 4.64 | 135 | 111 | 135 | 153 | 125 | 153 | 102 | 97 | 96 | 103 | 95 | 92 |
| | | IRRIGATED | 6.35 | 127 | 106 | 126 | 142 | 118 | 139 | 102 | 103 | 104 | 104 | 106 | 108 |
| Sunflower | RAINFED | 1.55 | 130 | 110 | 130 | 154 | 129 | 154 | 100 | 98 | 96 | 99 | 95 | 91 | |
| | IRRIGATED | 2.33 | 123 | 105 | 122 | 143 | 121 | 141 | 100 | 99 | 99 | 99 | 98 | 97 | |
| Latin America and Caribbean | All | RAINFED | 6.73 | 116 | 94 | 109 | 130 | 105 | 113 | 98 | 98 | 96 | 95 | 96 | 91 |
| | | IRRIGATED | 28.85 | 112 | 91 | 105 | 123 | 100 | 106 | 98 | 98 | 98 | 97 | 95 | 95 |
| | Soybeans | RAINFED | 2.68 | 117 | 106 | 113 | 131 | 118 | 121 | 99 | 99 | 96 | 98 | 97 | 92 |
| | | IRRIGATED | 1.52 | 110 | 99 | 107 | 117 | 105 | 110 | 99 | 98 | 99 | 99 | 97 | 98 |
| | Sugar cane | RAINFED | 59.44 | 112 | 101 | 109 | 121 | 109 | 114 | 97 | 98 | 94 | 93 | 95 | 87 |
| | | IRRIGATED | 87.09 | 111 | 100 | 107 | 120 | 108 | 112 | 98 | 98 | 97 | 96 | 95 | 94 |
| | Maize | RAINFED | 4.05 | 132 | 119 | 128 | 160 | 144 | 149 | 100 | 101 | 101 | 101 | 101 | 102 |
| | | IRRIGATED | 5.19 | 130 | 117 | 124 | 158 | 142 | 143 | 100 | 100 | 100 | 100 | 101 | 100 |
| | Vegetables | RAINFED | 14.34 | 120 | 108 | 116 | 136 | 123 | 125 | 97 | 96 | 95 | 94 | 92 | 90 |
| | | IRRIGATED | 18.56 | 118 | 107 | 114 | 134 | 120 | 124 | 98 | 98 | 98 | 96 | 96 | 95 |
| Coffee | RAINFED | 0.96 | 129 | 116 | 124 | 140 | 126 | 131 | 99 | 99 | 98 | 98 | 98 | 95 | |
| | IRRIGATED | 0.83 | 103 | 93 | 98 | 107 | 96 | 95 | 97 | 96 | 96 | 95 | 91 | 91 | |
| Near East and North Africa | All | RAINFED | 1.64 | 119 | 97 | 113 | 133 | 108 | 119 | 100 | 100 | 96 | 100 | 100 | 91 |
| | | IRRIGATED | 9.00 | 119 | 97 | 113 | 132 | 107 | 118 | 98 | 98 | 97 | 97 | 96 | 93 |
| | Vegetables | RAINFED | 9.59 | 122 | 110 | 119 | 137 | 123 | 130 | 99 | 94 | 98 | 99 | 88 | 95 |
| | | IRRIGATED | 29.85 | 122 | 110 | 119 | 137 | 123 | 130 | 98 | 98 | 97 | 96 | 96 | 94 |
| | Wheat | RAINFED | 1.10 | 125 | 113 | 122 | 141 | 127 | 133 | 97 | 95 | 94 | 94 | 89 | 87 |
| | | IRRIGATED | 2.96 | 125 | 113 | 122 | 141 | 127 | 133 | 97 | 97 | 95 | 95 | 93 | 89 |
| | Potatoes | RAINFED | 10.24 | 123 | 111 | 120 | 137 | 124 | 130 | 100 | 98 | 97 | 100 | 96 | 94 |
| | | IRRIGATED | 27.06 | 123 | 111 | 120 | 137 | 124 | 130 | 97 | 96 | 95 | 94 | 93 | 89 |
| | Citrus | RAINFED | 14.00 | 116 | 105 | 113 | 131 | 118 | 124 | 105 | 124 | 90 | 121 | 161 | 89 |
| | | IRRIGATED | 25.70 | 116 | 105 | 113 | 131 | 118 | 124 | 90 | 90 | 90 | 90 | 90 | 90 |
| Rice | IRRIGATED | 6.74 | 113 | 102 | 110 | 119 | 107 | 112 | 100 | 100 | 99 | 99 | 99 | 99 | |

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region (continued)

| REGIONS | CROPS | | YIELD | TECHNOLOGY (index, 2012 = 100) | | | | | | CLIMATE (index, 2012 = 100) | | | | | |
|--|------------|-----------|-----------|--------------------------------|-----|-----|------|-----|-----|-----------------------------|-----|-----|------|-----|-----|
| | | | 2012 | 2030 | | | 2050 | | | 2030 | | | 2050 | | |
| | | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Sub-Saharan Africa | All | RAINFED | 2.79 | 119 | 96 | 108 | 139 | 112 | 113 | 97 | 97 | 95 | 95 | 95 | 90 |
| | | IRRIGATED | 11.19 | 113 | 91 | 101 | 126 | 102 | 100 | 99 | 99 | 98 | 98 | 98 | 95 |
| | Cassava | RAINFED | 9.37 | 114 | 103 | 109 | 129 | 116 | 117 | 97 | 97 | 95 | 93 | 94 | 89 |
| | | IRRIGATED | 11.01 | 122 | 110 | 116 | 144 | 130 | 128 | 97 | 97 | 95 | 93 | 94 | 89 |
| | Yams | RAINFED | 7.66 | 111 | 100 | 107 | 123 | 110 | 112 | 97 | 97 | 94 | 94 | 93 | 87 |
| | | IRRIGATED | 11.01 | 122 | 110 | 116 | 144 | 130 | 128 | 97 | 97 | 95 | 93 | 94 | 89 |
| | Vegetables | RAINFED | 6.08 | 131 | 118 | 125 | 163 | 146 | 147 | 96 | 96 | 93 | 91 | 91 | 86 |
| | | IRRIGATED | 10.74 | 137 | 124 | 130 | 176 | 158 | 157 | 95 | 96 | 93 | 90 | 92 | 85 |
| | Maize | RAINFED | 1.66 | 120 | 108 | 114 | 143 | 128 | 128 | 98 | 98 | 97 | 97 | 95 | 94 |
| IRRIGATED | | 5.33 | 119 | 108 | 113 | 142 | 128 | 126 | 98 | 98 | 98 | 96 | 95 | 95 | |
| Rice | RAINFED | 1.80 | 137 | 123 | 131 | 172 | 154 | 156 | 99 | 98 | 98 | 98 | 96 | 95 | |
| | IRRIGATED | 3.21 | 130 | 117 | 123 | 163 | 147 | 145 | 99 | 99 | 98 | 98 | 98 | 96 | |
| Low- and middle-income countries | All | RAINFED | 4.65 | 119 | 95 | 114 | 134 | 107 | 121 | 98 | 99 | 97 | 97 | 97 | 93 |
| | | IRRIGATED | 9.84 | 117 | 94 | 112 | 129 | 104 | 117 | 99 | 99 | 98 | 98 | 98 | 96 |
| | Vegetables | RAINFED | 14.45 | 119 | 107 | 118 | 135 | 121 | 132 | 98 | 99 | 98 | 97 | 97 | 95 |
| | | IRRIGATED | 24.47 | 118 | 106 | 117 | 133 | 120 | 130 | 99 | 100 | 99 | 98 | 99 | 97 |
| | Rice | RAINFED | 2.83 | 125 | 112 | 121 | 143 | 129 | 135 | 98 | 99 | 97 | 97 | 97 | 93 |
| | | IRRIGATED | 5.20 | 118 | 106 | 116 | 129 | 116 | 124 | 100 | 100 | 100 | 101 | 101 | 100 |
| | Maize | RAINFED | 3.27 | 126 | 112 | 123 | 148 | 131 | 140 | 100 | 100 | 100 | 101 | 100 | 99 |
| | | IRRIGATED | 5.70 | 116 | 104 | 115 | 127 | 114 | 123 | 102 | 103 | 103 | 105 | 106 | 107 |
| | Wheat | RAINFED | 2.03 | 121 | 107 | 119 | 137 | 121 | 133 | 100 | 99 | 97 | 100 | 99 | 94 |
| IRRIGATED | | 3.84 | 122 | 110 | 120 | 137 | 123 | 131 | 98 | 98 | 97 | 96 | 95 | 93 | |
| Sugar cane | RAINFED | 54.53 | 112 | 101 | 109 | 122 | 110 | 115 | 97 | 98 | 94 | 93 | 95 | 88 | |
| | IRRIGATED | 78.37 | 113 | 102 | 110 | 125 | 112 | 117 | 98 | 98 | 97 | 97 | 96 | 93 | |
| Low- and middle-income countries (excluding China) | All | RAINFED | 4.18 | 120 | 96 | 113 | 135 | 108 | 119 | 98 | 98 | 96 | 96 | 96 | 92 |
| | | IRRIGATED | 9.93 | 118 | 95 | 111 | 133 | 107 | 116 | 98 | 98 | 96 | 96 | 95 | 92 |
| | Rice | RAINFED | 2.83 | 125 | 112 | 121 | 143 | 129 | 135 | 98 | 99 | 97 | 97 | 97 | 93 |
| | | IRRIGATED | 4.60 | 125 | 113 | 122 | 143 | 128 | 134 | 100 | 99 | 99 | 99 | 98 | 98 |
| | Vegetables | RAINFED | 9.74 | 123 | 110 | 120 | 142 | 127 | 134 | 98 | 97 | 95 | 95 | 93 | 89 |
| | | IRRIGATED | 21.13 | 120 | 108 | 117 | 136 | 122 | 128 | 98 | 98 | 96 | 95 | 95 | 92 |
| | Maize | RAINFED | 3.02 | 131 | 116 | 127 | 156 | 138 | 147 | 100 | 99 | 99 | 100 | 98 | 98 |
| | | IRRIGATED | 4.89 | 132 | 117 | 128 | 159 | 141 | 148 | 100 | 100 | 100 | 100 | 100 | 101 |
| | Wheat | RAINFED | 1.88 | 122 | 108 | 120 | 140 | 123 | 135 | 101 | 99 | 98 | 101 | 99 | 95 |
| IRRIGATED | | 3.35 | 127 | 114 | 123 | 147 | 132 | 138 | 97 | 96 | 94 | 94 | 92 | 88 | |
| Cassava | RAINFED | 11.72 | 119 | 107 | 114 | 134 | 120 | 123 | 96 | 96 | 93 | 92 | 92 | 85 | |

Table S 2.1 Projected yields changes from climate change and technical progress by period, production system and scenario for the most important crops by region (continued)

| REGIONS | CROPS | | YIELD | TECHNOLOGY (index, 2012 = 100) | | | | | | CLIMATE (index, 2012 = 100) | | | | | |
|---------|------------|-----------|-----------|--------------------------------|-----|-----|------|-----|-----|-----------------------------|-----|-----|------|-----|-----|
| | | | 2012 | 2030 | | | 2050 | | | 2030 | | | 2050 | | |
| | | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| World | All | RAINFED | 4.79 | 117 | 90 | 113 | 131 | 100 | 121 | 99 | 99 | 97 | 98 | 98 | 94 |
| | | IRRIGATED | 9.86 | 116 | 91 | 111 | 128 | 101 | 117 | 99 | 99 | 99 | 99 | 98 | 97 |
| | Vegetables | RAINFED | 15.35 | 118 | 105 | 117 | 134 | 118 | 131 | 99 | 99 | 98 | 97 | 97 | 95 |
| | | IRRIGATED | 25.26 | 118 | 105 | 116 | 132 | 118 | 129 | 99 | 100 | 99 | 98 | 99 | 97 |
| | Rice | RAINFED | 2.84 | 125 | 112 | 121 | 143 | 129 | 135 | 99 | 99 | 97 | 97 | 98 | 93 |
| | | IRRIGATED | 5.28 | 117 | 105 | 115 | 129 | 115 | 123 | 100 | 100 | 100 | 101 | 101 | 100 |
| | Maize | RAINFED | 4.45 | 118 | 101 | 117 | 132 | 113 | 128 | 101 | 100 | 99 | 101 | 100 | 99 |
| | | IRRIGATED | 6.81 | 113 | 97 | 112 | 121 | 104 | 119 | 103 | 103 | 103 | 106 | 106 | 107 |
| | Wheat | RAINFED | 2.63 | 116 | 97 | 115 | 128 | 107 | 126 | 101 | 100 | 99 | 102 | 100 | 98 |
| | | IRRIGATED | 3.97 | 120 | 106 | 118 | 134 | 118 | 129 | 98 | 98 | 97 | 97 | 96 | 94 |
| | Soybeans | RAINFED | 2.45 | 117 | 101 | 114 | 130 | 112 | 124 | 100 | 99 | 97 | 99 | 98 | 94 |
| | | IRRIGATED | 1.85 | 116 | 104 | 115 | 129 | 116 | 126 | 100 | 100 | 99 | 100 | 101 | 99 |

Note: Crops are sorted by value of production, using base-year prices.

Sources: FAO Global Perspectives Studies, based on FAO-IIASA Global Agro-ecological Zones (GAEZ) v4, for climate change; expert judgement for technological change; and both sources for the combined effect.

Table S 2.2 Gross agricultural output at base-year prices

| REGIONS | COMMODITY GROUPS | index | | | | | | |
|---|----------------------|-----------|------|-----|-----|------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Cereals and oilseeds | 100 | 127 | 108 | 141 | 140 | 118 | 154 |
| | Fruit and vegetables | 100 | 134 | 117 | 143 | 155 | 136 | 171 |
| | Animal products | 100 | 110 | 96 | 120 | 114 | 85 | 113 |
| | Industrial crops | 100 | 131 | 117 | 148 | 153 | 136 | 188 |
| | Other agriculture | 100 | 122 | 101 | 128 | 125 | 104 | 137 |
| | Total agriculture | 100 | 120 | 104 | 131 | 130 | 106 | 139 |
| East Asia and Pacific | Cereals and oilseeds | 100 | 126 | 118 | 128 | 136 | 130 | 139 |
| | Fruit and vegetables | 100 | 125 | 125 | 129 | 128 | 135 | 137 |
| | Animal products | 100 | 132 | 118 | 147 | 140 | 119 | 146 |
| | Industrial crops | 100 | 146 | 136 | 149 | 179 | 169 | 192 |
| | Other agriculture | 100 | 117 | 115 | 122 | 120 | 123 | 135 |
| | Total agriculture | 100 | 128 | 121 | 134 | 135 | 130 | 141 |
| China | Cereals and oilseeds | 100 | 124 | 114 | 128 | 129 | 118 | 136 |
| | Fruit and vegetables | 100 | 124 | 125 | 129 | 124 | 134 | 137 |
| | Animal products | 100 | 130 | 114 | 148 | 133 | 107 | 139 |
| | Industrial crops | 100 | 154 | 143 | 161 | 195 | 182 | 219 |
| | Other agriculture | 100 | 117 | 119 | 125 | 114 | 129 | 134 |
| | Total agriculture | 100 | 127 | 120 | 135 | 130 | 125 | 139 |
| East Asia and Pacific (excluding China) | Cereals and oilseeds | 100 | 129 | 125 | 128 | 146 | 145 | 143 |
| | Fruit and vegetables | 100 | 129 | 125 | 128 | 144 | 140 | 139 |
| | Animal products | 100 | 140 | 135 | 147 | 174 | 175 | 182 |
| | Industrial crops | 100 | 127 | 121 | 119 | 140 | 138 | 126 |
| | Other agriculture | 100 | 117 | 110 | 120 | 127 | 115 | 136 |
| | Total agriculture | 100 | 130 | 125 | 130 | 149 | 147 | 147 |
| South Asia | Cereals and oilseeds | 100 | 132 | 120 | 129 | 149 | 131 | 140 |
| | Fruit and vegetables | 100 | 146 | 132 | 137 | 182 | 162 | 164 |
| | Animal products | 100 | 138 | 132 | 130 | 145 | 149 | 155 |
| | Industrial crops | 100 | 133 | 116 | 125 | 149 | 121 | 132 |
| | Other agriculture | 100 | 115 | 105 | 114 | 118 | 105 | 120 |
| | Total agriculture | 100 | 137 | 125 | 131 | 156 | 142 | 149 |
| Europe and Central Asia | Cereals and oilseeds | 100 | 136 | 124 | 140 | 159 | 146 | 159 |
| | Fruit and vegetables | 100 | 137 | 130 | 138 | 155 | 152 | 160 |
| | Animal products | 100 | 157 | 144 | 178 | 195 | 176 | 207 |
| | Industrial crops | 100 | 134 | 125 | 135 | 146 | 138 | 150 |
| | Other agriculture | 100 | 121 | 112 | 122 | 128 | 118 | 133 |
| | Total agriculture | 100 | 143 | 133 | 152 | 169 | 157 | 175 |

Table S.2.2 Gross agricultural output at base-year prices (continued)

| REGIONS | COMMODITY GROUPS | index | | | | | | |
|--|----------------------|-----------|------|-----|-----|------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Cereals and oilseeds | 100 | 140 | 134 | 143 | 176 | 172 | 169 |
| | Fruit and vegetables | 100 | 128 | 127 | 127 | 149 | 150 | 145 |
| | Animal products | 100 | 133 | 119 | 149 | 155 | 129 | 163 |
| | Industrial crops | 100 | 123 | 122 | 119 | 137 | 142 | 128 |
| | Other agriculture | 100 | 127 | 130 | 135 | 140 | 141 | 165 |
| | Total agriculture | 100 | 132 | 125 | 138 | 156 | 146 | 157 |
| Near East and North Africa | Cereals and oilseeds | 100 | 119 | 102 | 116 | 119 | 94 | 111 |
| | Fruit and vegetables | 100 | 126 | 115 | 122 | 134 | 118 | 130 |
| | Animal products | 100 | 136 | 132 | 132 | 184 | 180 | 174 |
| | Industrial crops | 100 | 112 | 101 | 114 | 111 | 90 | 121 |
| | Other agriculture | 100 | 117 | 108 | 117 | 117 | 106 | 121 |
| | Total agriculture | 100 | 127 | 117 | 124 | 145 | 131 | 139 |
| Sub-Saharan Africa | Cereals and oilseeds | 100 | 172 | 167 | 172 | 257 | 255 | 242 |
| | Fruit and vegetables | 100 | 156 | 153 | 156 | 219 | 221 | 210 |
| | Animal products | 100 | 218 | 219 | 233 | 378 | 441 | 363 |
| | Industrial crops | 100 | 119 | 120 | 115 | 131 | 140 | 120 |
| | Other agriculture | 100 | 120 | 118 | 122 | 131 | 128 | 137 |
| | Total agriculture | 100 | 168 | 166 | 172 | 251 | 264 | 241 |
| Low- and middle-income countries | Cereals and oilseeds | 100 | 134 | 125 | 135 | 155 | 146 | 152 |
| | Fruit and vegetables | 100 | 134 | 130 | 134 | 153 | 152 | 153 |
| | Animal products | 100 | 143 | 132 | 155 | 171 | 159 | 176 |
| | Industrial crops | 100 | 132 | 123 | 128 | 150 | 141 | 145 |
| | Other agriculture | 100 | 119 | 116 | 123 | 125 | 123 | 137 |
| | Total agriculture | 100 | 135 | 128 | 139 | 157 | 151 | 158 |
| Low- and middle-income countries (excluding China) | Cereals and oilseeds | 100 | 137 | 129 | 137 | 164 | 155 | 158 |
| | Fruit and vegetables | 100 | 140 | 133 | 137 | 171 | 164 | 164 |
| | Animal products | 100 | 149 | 140 | 158 | 188 | 183 | 193 |
| | Industrial crops | 100 | 128 | 120 | 122 | 141 | 133 | 130 |
| | Other agriculture | 100 | 120 | 115 | 122 | 128 | 121 | 138 |
| | Total agriculture | 100 | 139 | 132 | 141 | 170 | 163 | 167 |
| World | Cereals and oilseeds | 100 | 132 | 120 | 136 | 151 | 138 | 153 |
| | Fruit and vegetables | 100 | 134 | 128 | 135 | 153 | 150 | 156 |
| | Animal products | 100 | 131 | 118 | 142 | 150 | 132 | 153 |
| | Industrial crops | 100 | 132 | 122 | 131 | 150 | 140 | 150 |
| | Other agriculture | 100 | 119 | 115 | 123 | 125 | 121 | 137 |
| | Total agriculture | 100 | 132 | 122 | 137 | 150 | 140 | 153 |

Note: Gross agricultural output is measured as the sum of all primary agricultural commodities as defined in Annex III Table A 3.3 of the report, multiplied by their corresponding base-year prices. Note that this excludes natural rubber but includes both feed and animal products. Fish, on the other hand, is excluded to maintain comparability of this indicator with previous FAO studies.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPs model.

Table S 2.3 Historical dietary per capita energy supply and projected dietary energy consumption

| REGIONS | COMMODITY GROUPS | kcal/person/day | | | | | | | | index, 2012 = 100 | | |
|---|----------------------|-----------------|-----------|-------|-------|-------|-------|-------|-------|-------------------|-----|-----|
| | | 1961 | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | HISTORICAL | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Cereals and products | 986 | 933 | 953 | 959 | 923 | 940 | 944 | 930 | 101 | 101 | 100 |
| | Fruit and vegetables | 139 | 188 | 200 | 194 | 191 | 205 | 189 | 194 | 109 | 101 | 103 |
| | Animal products | 669 | 796 | 820 | 738 | 818 | 830 | 700 | 841 | 104 | 88 | 106 |
| | Vegetable oil | 206 | 481 | 494 | 477 | 483 | 500 | 477 | 509 | 104 | 99 | 106 |
| | Other food | 855 | 922 | 950 | 904 | 915 | 956 | 888 | 935 | 104 | 96 | 101 |
| | Total food | 2 855 | 3 311 | 3 408 | 3 271 | 3 303 | 3 421 | 3 198 | 3 380 | 103 | 97 | 102 |
| East Asia and Pacific | Cereals and products | 902 | 1 412 | 1 408 | 1 444 | 1 392 | 1 341 | 1 344 | 1 371 | 95 | 95 | 97 |
| | Fruit and vegetables | 69 | 257 | 316 | 332 | 296 | 324 | 348 | 318 | 126 | 135 | 124 |
| | Animal products | 62 | 521 | 596 | 577 | 563 | 580 | 551 | 537 | 111 | 106 | 103 |
| | Vegetable oil | 35 | 172 | 193 | 156 | 199 | 190 | 138 | 209 | 110 | 80 | 121 |
| | Other food | 460 | 496 | 543 | 541 | 530 | 549 | 547 | 545 | 111 | 110 | 110 |
| | Total food | 1 528 | 2 850 | 3 046 | 3 050 | 2 951 | 2 974 | 2 927 | 2 950 | 104 | 103 | 104 |
| China | Cereals and products | 800 | 1 378 | 1 362 | 1 401 | 1 347 | 1 292 | 1 304 | 1 313 | 94 | 95 | 95 |
| | Fruit and vegetables | 65 | 316 | 400 | 421 | 375 | 419 | 448 | 411 | 133 | 142 | 130 |
| | Animal products | 46 | 632 | 733 | 697 | 688 | 723 | 665 | 669 | 115 | 105 | 106 |
| | Vegetable oil | 26 | 169 | 190 | 131 | 207 | 184 | 99 | 224 | 109 | 58 | 133 |
| | Other food | 477 | 487 | 527 | 519 | 520 | 530 | 514 | 536 | 109 | 106 | 110 |
| | Total food | 1 414 | 2 971 | 3 202 | 3 168 | 3 104 | 3 137 | 3 029 | 3 120 | 106 | 102 | 105 |
| East Asia and Pacific (excluding China) | Cereals and products | 1 189 | 1 484 | 1 494 | 1 525 | 1 474 | 1 421 | 1 408 | 1 464 | 96 | 95 | 99 |
| | Fruit and vegetables | 78 | 133 | 159 | 165 | 150 | 171 | 186 | 166 | 129 | 140 | 125 |
| | Animal products | 106 | 288 | 340 | 356 | 329 | 347 | 366 | 323 | 121 | 127 | 112 |
| | Vegetable oil | 62 | 180 | 198 | 203 | 186 | 198 | 203 | 184 | 110 | 113 | 103 |
| | Other food | 412 | 516 | 571 | 582 | 548 | 579 | 600 | 559 | 112 | 116 | 108 |
| | Total food | 1 847 | 2 594 | 2 755 | 2 830 | 2 667 | 2 709 | 2 761 | 2 675 | 104 | 106 | 103 |
| South Asia | Cereals and products | 1 319 | 1 361 | 1 453 | 1 492 | 1 378 | 1 459 | 1 516 | 1 405 | 107 | 111 | 103 |
| | Fruit and vegetables | 51 | 107 | 128 | 133 | 123 | 135 | 151 | 136 | 126 | 140 | 127 |
| | Animal products | 122 | 238 | 274 | 280 | 266 | 276 | 278 | 260 | 116 | 117 | 109 |
| | Vegetable oil | 88 | 195 | 210 | 215 | 199 | 210 | 215 | 197 | 108 | 110 | 101 |
| | Other food | 445 | 479 | 543 | 553 | 522 | 551 | 576 | 538 | 115 | 120 | 112 |
| | Total food | 2 024 | 2 376 | 2 602 | 2 673 | 2 474 | 2 626 | 2 735 | 2 519 | 111 | 115 | 106 |
| Europe and Central Asia | Cereals and products | 1 720 | 1 227 | 1 265 | 1 283 | 1 227 | 1 241 | 1 260 | 1 231 | 101 | 103 | 100 |
| | Fruit and vegetables | 224 | 212 | 246 | 255 | 238 | 260 | 278 | 266 | 123 | 132 | 125 |
| | Animal products | 402 | 622 | 656 | 646 | 643 | 649 | 630 | 624 | 104 | 101 | 100 |
| | Vegetable oil | 177 | 336 | 361 | 366 | 343 | 364 | 369 | 344 | 108 | 110 | 102 |
| | Other food | 397 | 781 | 816 | 806 | 781 | 798 | 795 | 776 | 102 | 102 | 99 |
| | Total food | 2 921 | 3 171 | 3 338 | 3 355 | 3 212 | 3 305 | 3 332 | 3 221 | 104 | 105 | 102 |

Table S2.3 Historical dietary per capita energy supply and projected dietary energy consumption (continued)

| REGIONS | COMMODITY GROUPS | kcal/person/day | | | | | | | | index, 2012 = 100 | | |
|--|----------------------|-----------------|-----------|-------|-------|-------|-------|-------|-------|-------------------|-----|-----|
| | | 1961 | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | HISTORICAL | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Cereals and products | 914 | 1 008 | 1 025 | 1 067 | 966 | 1 012 | 1 071 | 972 | 100 | 106 | 96 |
| | Fruit and vegetables | 105 | 139 | 153 | 162 | 139 | 158 | 183 | 139 | 113 | 131 | 100 |
| | Animal products | 307 | 564 | 603 | 599 | 584 | 605 | 587 | 566 | 107 | 104 | 100 |
| | Vegetable oil | 108 | 317 | 333 | 327 | 311 | 334 | 319 | 321 | 105 | 101 | 101 |
| | Other food | 813 | 860 | 904 | 885 | 856 | 907 | 873 | 876 | 105 | 102 | 102 |
| | Total food | 2 248 | 2 876 | 3 007 | 3 039 | 2 822 | 3 004 | 3 032 | 2 841 | 104 | 105 | 99 |
| Near East and North Africa | Cereals and products | 1 217 | 1 671 | 1 710 | 1 772 | 1 612 | 1 657 | 1 740 | 1 615 | 99 | 104 | 97 |
| | Fruit and vegetables | 127 | 258 | 285 | 290 | 265 | 298 | 310 | 289 | 116 | 120 | 112 |
| | Animal products | 157 | 287 | 321 | 316 | 317 | 321 | 313 | 305 | 112 | 109 | 106 |
| | Vegetable oil | 102 | 271 | 290 | 291 | 270 | 290 | 291 | 272 | 107 | 107 | 100 |
| | Other food | 312 | 539 | 594 | 569 | 545 | 594 | 575 | 562 | 110 | 107 | 104 |
| | Total food | 1 915 | 3 019 | 3 195 | 3 236 | 2 994 | 3 155 | 3 228 | 3 027 | 104 | 107 | 100 |
| Sub-Saharan Africa | Cereals and products | 929 | 1 069 | 1 220 | 1 286 | 1 143 | 1 189 | 1 234 | 1 154 | 111 | 115 | 108 |
| | Fruit and vegetables | 82 | 92 | 111 | 118 | 100 | 122 | 149 | 107 | 133 | 162 | 117 |
| | Animal products | 124 | 175 | 207 | 227 | 199 | 230 | 231 | 192 | 131 | 132 | 109 |
| | Vegetable oil | 130 | 188 | 204 | 212 | 188 | 202 | 207 | 184 | 108 | 110 | 98 |
| | Other food | 746 | 849 | 932 | 968 | 870 | 950 | 1 011 | 886 | 112 | 119 | 104 |
| | Total food | 2 011 | 2 363 | 2 664 | 2 810 | 2 468 | 2 683 | 2 831 | 2 490 | 114 | 120 | 105 |
| Low- and middle-income countries | Cereals and products | 1 064 | 1 307 | 1 358 | 1 401 | 1 302 | 1 321 | 1 361 | 1 297 | 101 | 104 | 99 |
| | Fruit and vegetables | 76 | 174 | 200 | 209 | 188 | 200 | 221 | 192 | 114 | 127 | 110 |
| | Animal products | 125 | 385 | 413 | 412 | 397 | 393 | 383 | 362 | 102 | 100 | 94 |
| | Vegetable oil | 74 | 212 | 229 | 221 | 220 | 227 | 215 | 220 | 107 | 101 | 104 |
| | Other food | 511 | 604 | 674 | 680 | 642 | 701 | 719 | 674 | 116 | 119 | 112 |
| | Total food | 1 850 | 2 674 | 2 866 | 2 923 | 2 724 | 2 833 | 2 898 | 2 720 | 106 | 108 | 102 |
| Low- and middle-income countries (excluding China) | Cereals and products | 1 188 | 1 286 | 1 356 | 1 402 | 1 291 | 1 326 | 1 372 | 1 294 | 103 | 107 | 101 |
| | Fruit and vegetables | 81 | 132 | 152 | 158 | 142 | 158 | 178 | 151 | 119 | 134 | 114 |
| | Animal products | 162 | 312 | 336 | 343 | 326 | 330 | 330 | 303 | 106 | 106 | 97 |
| | Vegetable oil | 97 | 225 | 238 | 243 | 223 | 235 | 237 | 219 | 104 | 105 | 97 |
| | Other food | 527 | 639 | 710 | 718 | 672 | 734 | 758 | 700 | 115 | 119 | 110 |
| | Total food | 2 055 | 2 587 | 2 784 | 2 863 | 2 632 | 2 775 | 2 873 | 2 644 | 107 | 111 | 102 |
| World | Cereals and products | 1 043 | 1 245 | 1 298 | 1 336 | 1 246 | 1 270 | 1 306 | 1 249 | 102 | 105 | 100 |
| | Fruit and vegetables | 93 | 177 | 200 | 207 | 188 | 200 | 217 | 192 | 113 | 123 | 109 |
| | Animal products | 269 | 452 | 473 | 460 | 459 | 451 | 425 | 425 | 100 | 94 | 94 |
| | Vegetable oil | 109 | 256 | 268 | 259 | 259 | 263 | 250 | 258 | 102 | 97 | 101 |
| | Other food | 602 | 656 | 715 | 713 | 682 | 735 | 741 | 709 | 112 | 113 | 108 |
| | Total food | 2 117 | 2 779 | 2 946 | 2 974 | 2 809 | 2 910 | 2 938 | 2 807 | 105 | 106 | 101 |

Note: Data for 1961 refer to per capita kilocalorie supply. Data for 2012 and thereafter refer to per capita kilocalorie consumption.

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 2.4 Historical and projected per capita protein supply

| REGIONS | COMMODITY GROUPS | grams/person/day | | | | | | | | index, 2012 = 100 | | |
|---|----------------------|------------------|-----------|------|-----|-----|------|-----|-----|-------------------|-----|-----|
| | | 1961 | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | HISTORICAL | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Cereals and products | 28 | 26 | 27 | 27 | 27 | 27 | 26 | 28 | 102 | 100 | 105 |
| | Fruit and vegetables | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 107 | 97 | 106 |
| | Animal products | 42 | 58 | 60 | 52 | 63 | 61 | 49 | 64 | 104 | 84 | 110 |
| | Other food | 10 | 11 | 14 | 13 | 13 | 14 | 13 | 14 | 105 | 98 | 105 |
| | Total food | 86 | 103 | 106 | 97 | 109 | 107 | 93 | 111 | 104 | 90 | 108 |
| East Asia and Pacific | Cereals and products | 20 | 33 | 33 | 33 | 35 | 31 | 30 | 34 | 94 | 91 | 104 |
| | Fruit and vegetables | 3 | 11 | 13 | 13 | 13 | 13 | 14 | 14 | 124 | 128 | 132 |
| | Animal products | 4 | 32 | 37 | 35 | 38 | 36 | 33 | 36 | 113 | 105 | 114 |
| | Other food | 3 | 8 | 13 | 13 | 13 | 13 | 13 | 13 | 112 | 112 | 115 |
| | Total food | 40 | 88 | 96 | 93 | 99 | 93 | 90 | 98 | 107 | 104 | 112 |
| China | Cereals and products | 19 | 34 | 34 | 33 | 36 | 32 | 31 | 35 | 94 | 91 | 104 |
| | Fruit and vegetables | 3 | 14 | 18 | 18 | 18 | 18 | 19 | 20 | 133 | 136 | 142 |
| | Animal products | 3 | 37 | 42 | 39 | 43 | 41 | 37 | 42 | 114 | 102 | 115 |
| | Other food | 4 | 9 | 14 | 14 | 15 | 14 | 14 | 15 | 114 | 112 | 118 |
| | Total food | 39 | 97 | 108 | 104 | 112 | 106 | 101 | 112 | 110 | 104 | 115 |
| East Asia and Pacific (excluding China) | Cereals and products | 24 | 31 | 31 | 31 | 33 | 30 | 29 | 33 | 96 | 92 | 105 |
| | Fruit and vegetables | 2 | 4 | 4 | 4 | 4 | 5 | 5 | 5 | 129 | 135 | 133 |
| | Animal products | 8 | 23 | 27 | 27 | 28 | 27 | 28 | 27 | 121 | 124 | 121 |
| | Other food | 3 | 5 | 10 | 10 | 10 | 10 | 11 | 11 | 114 | 117 | 116 |
| | Total food | 41 | 67 | | 73 | 76 | 72 | 73 | 76 | 109 | 109 | 114 |
| South Asia | Cereals and products | 30 | 32 | 35 | 35 | 35 | 35 | 36 | 36 | 107 | 109 | 109 |
| | Fruit and vegetables | 2 | 3 | 4 | 4 | 4 | 4 | 5 | 4 | 125 | 136 | 134 |
| | Animal products | 7 | 13 | 15 | 15 | 16 | 15 | 15 | 15 | 116 | 115 | 116 |
| | Other food | 2 | 3 | 12 | 12 | 12 | 12 | 13 | 12 | 114 | 119 | 118 |
| | Total food | 52 | 59 | 66 | 66 | 67 | 67 | 68 | 68 | 112 | 114 | 114 |
| Europe and Central Asia | Cereals and products | 52 | 37 | 38 | 38 | 39 | 38 | 37 | 40 | 101 | 100 | 106 |
| | Fruit and vegetables | 5 | 6 | 7 | 7 | 7 | 7 | 8 | 8 | 123 | 129 | 134 |
| | Animal products | 23 | 42 | 44 | 42 | 46 | 44 | 41 | 45 | 104 | 98 | 106 |
| | Other food | 6 | 13 | 12 | 12 | 12 | 12 | 12 | 13 | 104 | 103 | 107 |
| | Total food | 90 | 97 | 102 | 99 | 105 | 101 | 98 | 104 | 104 | 101 | 108 |
| Latin America and Caribbean | Cereals and products | 23 | 26 | 26 | 26 | 26 | 26 | 26 | 27 | 101 | 103 | 104 |
| | Fruit and vegetables | 2 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 114 | 127 | 107 |
| | Animal products | 21 | 40 | 43 | 42 | 45 | 43 | 41 | 44 | 108 | 101 | 108 |
| | Other food | 8 | 8 | 15 | 15 | 15 | 15 | 15 | 15 | 105 | 101 | 104 |
| | Total food | 60 | 83 | 88 | 86 | 89 | 88 | 86 | 88 | 105 | 103 | 106 |

Table S 2.4 Historical and projected per capita protein supply (continued)

| REGIONS | COMMODITY GROUPS | grams/person/day | | | | | | | | index, 2012 = 100 | | |
|--|----------------------|------------------|-----------|------|-----|-----|------|-----|-----|-------------------|-----|-----|
| | | 1961 | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | HISTORICAL | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Near East and North Africa | Cereals and products | 35 | 49 | 50 | 50 | 51 | 48 | 49 | 51 | 99 | 100 | 104 |
| | Fruit and vegetables | 3 | 7 | 8 | 7 | 8 | 8 | 8 | 8 | 117 | 117 | 123 |
| | Animal products | 9 | 22 | 25 | 23 | 27 | 25 | 23 | 26 | 114 | 104 | 118 |
| | Other food | 3 | 6 | 11 | 10 | 11 | 11 | 10 | 11 | 106 | 102 | 108 |
| | Total food | 53 | 88 | 93 | 91 | 96 | 92 | 90 | 96 | 105 | 103 | 110 |
| Sub-Saharan Africa | Cereals and products | 25 | 28 | 32 | 33 | 33 | 32 | 32 | 33 | 111 | 112 | 115 |
| | Fruit and vegetables | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 133 | 156 | 127 |
| | Animal products | 9 | 12 | 15 | 17 | 16 | 18 | 17 | 16 | 134 | 132 | 119 |
| | Other food | 9 | 11 | 21 | 22 | 21 | 22 | 23 | 22 | 117 | 124 | 115 |
| | Total food | 50 | 62 | 72 | 75 | 73 | 75 | 76 | 73 | 118 | 121 | 116 |
| Low- and middle-income countries | Cereals and products | 25 | 33 | 34 | 34 | 35 | 33 | 33 | 35 | 102 | 102 | 107 |
| | Fruit and vegetables | 2 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 110 | 117 | 115 |
| | Animal products | 8 | 25 | 27 | 26 | 28 | 26 | 25 | 25 | 105 | 100 | 103 |
| | Other food | 4 | 7 | 14 | 14 | 14 | 15 | 16 | 15 | 120 | 123 | 120 |
| | Total food | 48 | 76 | 82 | 81 | 84 | 81 | 80 | 83 | 106 | 106 | 109 |
| Low- and middle-income countries (excluding China) | Cereals and products | 29 | 32 | 34 | 34 | 35 | 34 | 34 | 35 | 104 | 105 | 108 |
| | Fruit and vegetables | 2 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 119 | 130 | 122 |
| | Animal products | 10 | 21 | 23 | 23 | 24 | 23 | 22 | 22 | 108 | 105 | 106 |
| | Other food | 4 | 7 | 14 | 14 | 14 | 15 | 16 | 15 | 121 | 125 | 121 |
| | Total food | 53 | 70 | 76 | 76 | 77 | 76 | 76 | 77 | 109 | 110 | 110 |
| World | Cereals and products | 26 | 32 | 33 | 33 | 34 | 33 | 32 | 34 | 102 | 102 | 107 |
| | Fruit and vegetables | 3 | 6 | 7 | 7 | 7 | 6 | 7 | 7 | 110 | 115 | 115 |
| | Animal products | 17 | 30 | 32 | 30 | 33 | 30 | 28 | 31 | 101 | 92 | 101 |
| | Other food | 6 | 8 | 14 | 14 | 14 | 15 | 15 | 15 | 118 | 119 | 118 |
| | Total food | 58 | 80 | 85 | 84 | 87 | 84 | 82 | 86 | 105 | 102 | 107 |

Source: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 2.5 Balances of gross agricultural commodities, including fish

| REGIONS | BALANCE ITEMS | million USD, 2012 exchange rates | | | | | | | index, 2012 = 100 | | |
|---|------------------------|----------------------------------|------|------|------|------|------|------|-------------------|------|------|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | Production | 1168 | 1384 | 1217 | 1497 | 1489 | 1237 | 1570 | 127 | 106 | 134 |
| | Food | 839 | 925 | 820 | 954 | 961 | 787 | 1008 | 115 | 94 | 120 |
| | Feed | 142 | 160 | 123 | 178 | 161 | 113 | 153 | 113 | 80 | 108 |
| | Other uses | 229 | 321 | 298 | 329 | 350 | 317 | 365 | 153 | 138 | 159 |
| | Net trade | -42 | -21 | -24 | 36 | 17 | 21 | 44 | - | - | - |
| | Self-sufficiency ratio | 0.97 | 0.99 | 0.98 | 1.02 | 1.01 | 1.02 | 1.03 | 105 | 105 | 107 |
| East Asia and Pacific | Production | 1773 | 2276 | 2199 | 2359 | 2421 | 2367 | 2511 | 137 | 133 | 142 |
| | Food | 1282 | 1603 | 1551 | 1645 | 1593 | 1531 | 1649 | 124 | 119 | 129 |
| | Feed | 166 | 248 | 205 | 289 | 263 | 220 | 266 | 158 | 132 | 160 |
| | Other uses | 311 | 388 | 342 | 388 | 425 | 374 | 428 | 136 | 120 | 138 |
| | Net trade | 13 | 36 | 102 | 37 | 140 | 241 | 168 | 1042 | 1796 | 1250 |
| | Self-sufficiency ratio | 1.01 | 1.02 | 1.05 | 1.02 | 1.06 | 1.11 | 1.07 | 105 | 110 | 106 |
| China | Production | 1281 | 1661 | 1596 | 1744 | 1732 | 1679 | 1828 | 135 | 131 | 143 |
| | Food | 1003 | 1225 | 1167 | 1256 | 1172 | 1100 | 1218 | 117 | 110 | 121 |
| | Feed | 137 | 194 | 156 | 228 | 189 | 147 | 188 | 138 | 107 | 138 |
| | Other uses | 201 | 238 | 199 | 238 | 254 | 208 | 256 | 127 | 103 | 127 |
| | Net trade | -60 | 4 | 73 | 22 | 117 | 224 | 166 | - | - | - |
| | Self-sufficiency ratio | 0.96 | 1.00 | 1.05 | 1.01 | 1.07 | 1.15 | 1.10 | 112 | 121 | 115 |
| East Asia and Pacific (excluding China) | Production | 492 | 615 | 603 | 615 | 688 | 688 | 683 | 140 | 140 | 139 |
| | Food | 279 | 378 | 383 | 389 | 421 | 431 | 431 | 151 | 155 | 154 |
| | Feed | 30 | 54 | 49 | 61 | 74 | 73 | 78 | 250 | 248 | 264 |
| | Other uses | 111 | 150 | 142 | 150 | 170 | 167 | 172 | 154 | 151 | 156 |
| | Net trade | 73 | 32 | 28 | 15 | 23 | 17 | 2 | 31 | 23 | 2 |
| | Self-sufficiency ratio | 1.17 | 1.06 | 1.05 | 1.02 | 1.03 | 1.03 | 1.00 | 88 | 87 | 85 |
| South Asia | Production | 564 | 776 | 717 | 744 | 893 | 820 | 856 | 158 | 145 | 152 |
| | Food | 426 | 595 | 600 | 608 | 686 | 709 | 706 | 161 | 166 | 166 |
| | Feed | 11 | 17 | 15 | 17 | 22 | 23 | 20 | 197 | 210 | 180 |
| | Other uses | 125 | 159 | 143 | 163 | 186 | 171 | 194 | 149 | 136 | 155 |
| | Net trade | 2 | 5 | -40 | -44 | -1 | -83 | -63 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.01 | 0.95 | 0.94 | 1.00 | 0.91 | 0.93 | 100 | 91 | 93 |
| Europe and Central Asia | Production | 341 | 482 | 449 | 512 | 573 | 532 | 592 | 168 | 156 | 173 |
| | Food | 227 | 255 | 248 | 263 | 253 | 246 | 264 | 111 | 108 | 116 |
| | Feed | 43 | 59 | 49 | 67 | 70 | 59 | 72 | 163 | 138 | 167 |
| | Other uses | 75 | 92 | 85 | 96 | 104 | 95 | 111 | 138 | 126 | 147 |
| | Net trade | -4 | 77 | 68 | 85 | 146 | 132 | 146 | - | - | - |
| | Self-sufficiency ratio | 0.99 | 1.19 | 1.18 | 1.20 | 1.34 | 1.33 | 1.33 | 136 | 135 | 134 |

Table S 2.5 Balances of gross agricultural commodities, including fish (continued)

| REGIONS | BALANCE ITEMS | million USD, 2012 exchange rates | | | | | | | index, 2012 = 100 | | |
|--|------------------------|----------------------------------|-------|-------|-------|-------|-------|-------|-------------------|------|------|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | Production | 566 | 726 | 695 | 758 | 842 | 799 | 846 | 149 | 141 | 149 |
| | Food | 303 | 381 | 372 | 391 | 419 | 409 | 419 | 138 | 135 | 138 |
| | Feed | 33 | 47 | 39 | 57 | 58 | 52 | 73 | 174 | 157 | 220 |
| | Other uses | 140 | 176 | 166 | 180 | 196 | 189 | 201 | 140 | 135 | 143 |
| | Net trade | 90 | 122 | 118 | 131 | 169 | 149 | 152 | 188 | 167 | 170 |
| | Self-sufficiency ratio | 1.19 | 1.20 | 1.20 | 1.21 | 1.25 | 1.23 | 1.22 | 105 | 103 | 103 |
| Near East and North Africa | Production | 154 | 195 | 182 | 190 | 223 | 204 | 215 | 144 | 133 | 139 |
| | Food | 151 | 219 | 209 | 229 | 273 | 260 | 286 | 181 | 172 | 190 |
| | Feed | 12 | 15 | 13 | 15 | 17 | 16 | 17 | 147 | 134 | 139 |
| | Other uses | 23.1 | 34.1 | 27.9 | 34.7 | 41 | 32 | 42 | 176 | 139 | 183 |
| | Net trade | -32 | -73 | -68 | -88 | -109 | -103 | -130 | 342 | 325 | 411 |
| | Self-sufficiency ratio | 0.83 | 0.73 | 0.73 | 0.68 | 0.67 | 0.66 | 0.62 | 81 | 80 | 75 |
| Sub-Saharan Africa | Production | 321 | 527 | 523 | 537 | 782 | 827 | 751 | 244 | 258 | 234 |
| | Food | 274 | 501 | 527 | 507 | 831 | 859 | 775 | 304 | 314 | 283 |
| | Feed | 31 | 79 | 71 | 95 | 183 | 211 | 168 | 591 | 683 | 544 |
| | Other uses | 46 | 94 | 80 | 92 | 131 | 114 | 123 | 283 | 246 | 267 |
| | Net trade | -30 | -147 | -154 | -157 | -362 | -357 | -316 | 1211 | 1193 | 1056 |
| | Self-sufficiency ratio | 0.91 | 0.78 | 0.77 | 0.77 | 0.68 | 0.70 | 0.70 | 75 | 76 | 77 |
| Low- and middle-income countries | Production | 3 719 | 4 983 | 4 765 | 5 100 | 5 733 | 5 549 | 5 770 | 154 | 149 | 155 |
| | Food | 2 663 | 3 554 | 3 507 | 3 642 | 4 055 | 4 013 | 4 099 | 152 | 151 | 154 |
| | Feed | 296 | 464 | 391 | 540 | 613 | 582 | 616 | 207 | 196 | 208 |
| | Other uses | 721 | 943 | 843 | 953 | 1 082 | 975 | 1 099 | 150 | 135 | 152 |
| | Net trade | 39 | 21 | 24 | -36 | -17 | -21 | -44 | - | - | - |
| | Self-sufficiency ratio | 1.01 | 1.00 | 1.01 | 0.99 | 1.00 | 1.00 | 0.99 | 99 | 99 | 98 |
| Low- and middle-income countries (excluding China) | Production | 2 439 | 3 322 | 3 169 | 3 356 | 4 001 | 3 871 | 3 942 | 164 | 159 | 162 |
| | Food | 1 660 | 2 329 | 2 339 | 2 387 | 2 884 | 2 913 | 2 881 | 174 | 176 | 174 |
| | Feed | 160 | 271 | 236 | 312 | 424 | 435 | 428 | 265 | 272 | 268 |
| | Other uses | 521 | 705 | 643 | 716 | 828 | 767 | 843 | 159 | 147 | 162 |
| | Net trade | 98 | 17 | -49 | -58 | -135 | -245 | -211 | - | - | - |
| | Self-sufficiency ratio | 1.04 | 1.01 | 0.98 | 0.98 | 0.97 | 0.94 | 0.95 | 93 | 90 | 91 |
| World | Production | 4 888 | 6 366 | 5 982 | 6 597 | 7 222 | 6 786 | 7 340 | 148 | 139 | 150 |
| | Food | 3 501 | 4 479 | 4 327 | 4 596 | 5 016 | 4 800 | 5 107 | 143 | 137 | 146 |
| | Feed | 438 | 624 | 514 | 718 | 774 | 695 | 769 | 177 | 158 | 175 |
| | Other uses | 948 | 1 264 | 1 140 | 1 283 | 1 432 | 1 291 | 1 464 | 151 | 136 | 154 |
| | Net trade | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - |
| | Self-sufficiency ratio | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 100 | 100 | 100 |

Notes: Net trade is calculated as domestic production – aggregate demand; positive (negative) denotes net exports (imports). The self-sufficiency ratio is the ratio of domestic production over domestic aggregate demand. "Other uses" refers to the sum of non-food domestic uses, including: seed, food losses, non-food processing, biofuels and other demand.

Source: FAO Global Perspectives Studies, based on simulations with the GAPS model.

Table S 2.6 Harvested area by region: total and top-five crops by production system

| ALL SYSTEMS | | million hectares | | | | | | | index, 2012 = 100 | | |
|---|----------------|------------------|-------|-------|-------|-------|-------|-------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| REGIONS | CROPS | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | All | 242.2 | 267.9 | 287.0 | 293.9 | 268.0 | 289.6 | 300.9 | 111 | 120 | 124 |
| | Vegetables | 4.7 | 5.6 | 6.0 | 6.0 | 5.7 | 6.2 | 6.5 | 120 | 132 | 137 |
| | Maize | 43.3 | 50.1 | 52.6 | 57.6 | 51.3 | 54.4 | 59.0 | 118 | 126 | 136 |
| | Fruits | 7.2 | 8.3 | 8.9 | 8.7 | 8.3 | 9.2 | 9.2 | 116 | 128 | 128 |
| | Wheat | 66.0 | 69.1 | 75.7 | 76.4 | 67.2 | 73.9 | 76.4 | 102 | 112 | 116 |
| | Soybeans | 34.3 | 39.6 | 42.3 | 42.4 | 39.6 | 43.1 | 43.3 | 115 | 126 | 126 |
| East Asia and Pacific | All | 298.9 | 322.6 | 336.6 | 330.3 | 313.3 | 333.7 | 329.7 | 105 | 112 | 110 |
| | Vegetables | 28.3 | 28.9 | 31.9 | 29.8 | 25.5 | 29.7 | 27.8 | 90 | 105 | 99 |
| | Rice | 80.3 | 86.4 | 88.4 | 87.2 | 85.9 | 88.3 | 87.7 | 107 | 110 | 109 |
| | Fruits | 13.5 | 13.5 | 14.9 | 14.0 | 11.8 | 13.7 | 12.8 | 87 | 101 | 95 |
| | Maize | 45.2 | 49.3 | 49.3 | 50.6 | 47.0 | 47.4 | 48.5 | 104 | 105 | 107 |
| | Sugar cane | 4.5 | 5.3 | 5.3 | 5.2 | 5.6 | 5.6 | 5.6 | 123 | 124 | 124 |
| China | All | 175.6 | 190.8 | 197.9 | 195.4 | 180.6 | 191.7 | 190.5 | 103 | 109 | 108 |
| | Vegetables | 24.2 | 24.6 | 27.2 | 25.4 | 21.2 | 25.1 | 23.3 | 88 | 104 | 96 |
| | Fruits | 10.0 | 9.9 | 11.0 | 10.2 | 8.3 | 9.9 | 9.0 | 83 | 99 | 90 |
| | Rice | 30.2 | 35.1 | 33.7 | 34.9 | 35.3 | 32.8 | 35.8 | 117 | 109 | 118 |
| | Maize | 35.0 | 38.7 | 38.6 | 39.6 | 36.7 | 36.9 | 37.8 | 105 | 105 | 108 |
| | Wheat | 24.2 | 26.3 | 27.0 | 27.1 | 25.4 | 26.0 | 26.6 | 105 | 107 | 110 |
| East Asia and Pacific (excluding China) | All | 123.3 | 131.8 | 138.7 | 134.9 | 132.7 | 142.1 | 139.2 | 108 | 115 | 113 |
| | Rice | 50.1 | 51.4 | 54.7 | 52.3 | 50.5 | 55.5 | 51.9 | 101 | 111 | 104 |
| | Palm oil | 11.9 | 14.7 | 15.7 | 15.2 | 15.7 | 16.9 | 17.4 | 132 | 142 | 147 |
| | Vegetables | 4.1 | 4.3 | 4.7 | 4.4 | 4.3 | 4.7 | 4.5 | 104 | 114 | 111 |
| | Natural rubber | 7.7 | 8.8 | 9.4 | 8.5 | 9.4 | 10.6 | 9.1 | 123 | 137 | 119 |
| | Sugar cane | 2.7 | 3.0 | 3.0 | 2.9 | 3.0 | 3.1 | 2.8 | 110 | 114 | 103 |
| South Asia | All | 241.8 | 260.6 | 263.0 | 263.9 | 262.0 | 260.9 | 269.1 | 108 | 108 | 111 |
| | Rice | 60.7 | 61.7 | 63.3 | 63.1 | 60.6 | 61.0 | 63.0 | 100 | 101 | 104 |
| | Wheat | 41.9 | 45.4 | 42.9 | 44.4 | 45.3 | 40.1 | 43.9 | 108 | 96 | 105 |
| | Vegetables | 9.4 | 11.7 | 11.9 | 11.7 | 13.1 | 13.2 | 13.4 | 138 | 140 | 142 |
| | Fruits | 6.2 | 7.7 | 7.5 | 7.5 | 8.6 | 8.2 | 8.5 | 140 | 132 | 139 |
| | Cotton | 14.9 | 15.6 | 15.4 | 15.5 | 15.5 | 15.0 | 15.5 | 104 | 101 | 104 |
| Europe and Central Asia | All | 146.4 | 156.5 | 168.4 | 165.9 | 157.4 | 172.0 | 170.4 | 108 | 117 | 116 |
| | Vegetables | 4.1 | 4.6 | 5.1 | 4.8 | 4.6 | 5.3 | 5.1 | 113 | 130 | 125 |
| | Wheat | 59.5 | 61.8 | 67.9 | 66.3 | 61.6 | 68.6 | 67.5 | 103 | 115 | 113 |
| | Potatoes | 5.0 | 5.6 | 5.9 | 5.9 | 5.9 | 6.2 | 6.3 | 117 | 124 | 126 |
| | Fruits | 3.9 | 4.4 | 4.8 | 4.5 | 4.4 | 4.9 | 4.7 | 111 | 124 | 120 |
| | Maize | 12.3 | 13.9 | 14.5 | 14.7 | 14.3 | 15.3 | 15.3 | 117 | 125 | 125 |

Table S 2.6 Harvested area by region: total and top-five crops by production system (continued)

| ALL SYSTEMS | | million hectares | | | | | | | index, 2012 = 100 | | |
|--|-------------|------------------|---------|---------|---------|---------|---------|---------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| REGIONS | CROPS | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | All | 150.7 | 169.7 | 179.4 | 179.0 | 180.7 | 193.6 | 194.8 | 120 | 128 | 129 |
| | Soybeans | 48.7 | 52.4 | 54.7 | 56.1 | 52.7 | 55.0 | 58.1 | 108 | 113 | 119 |
| | Sugar cane | 13.0 | 14.5 | 14.8 | 14.0 | 14.8 | 15.8 | 14.0 | 114 | 121 | 108 |
| | Maize | 31.1 | 37.2 | 38.9 | 39.9 | 42.4 | 45.0 | 44.9 | 136 | 145 | 144 |
| | Fruits | 2.9 | 3.2 | 3.5 | 3.3 | 3.3 | 3.7 | 3.5 | 111 | 125 | 120 |
| | Vegetables | 2.6 | 2.9 | 3.2 | 2.9 | 3.0 | 3.3 | 3.1 | 114 | 128 | 120 |
| Near East and North Africa | All | 44.4 | 45.5 | 45.7 | 46.5 | 43.3 | 42.2 | 45.3 | 97 | 95 | 102 |
| | Vegetables | 2.9 | 3.1 | 3.0 | 3.1 | 2.9 | 2.7 | 3.0 | 98 | 93 | 102 |
| | Fruits | 2.6 | 2.7 | 2.9 | 2.8 | 2.6 | 2.8 | 2.8 | 101 | 108 | 109 |
| | Wheat | 16.8 | 16.9 | 16.8 | 17.3 | 15.9 | 15.1 | 16.5 | 95 | 90 | 99 |
| | Other crops | 1.2 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 97 | 93 | 97 |
| | Potatoes | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.7 | 100 | 82 | 100 |
| Sub-Saharan Africa | All | 219.7 | 292.7 | 312.4 | 309.6 | 357.3 | 386.9 | 386.3 | 163 | 176 | 176 |
| | Cassava | 16.0 | 18.8 | 19.3 | 20.2 | 21.2 | 21.4 | 23.2 | 133 | 134 | 145 |
| | Yams | 10.3 | 11.9 | 12.2 | 12.6 | 13.2 | 13.3 | 14.1 | 128 | 129 | 137 |
| | Vegetables | 6.4 | 10.1 | 11.7 | 10.5 | 13.5 | 16.4 | 15.1 | 210 | 256 | 235 |
| | Maize | 35.3 | 51.8 | 53.5 | 54.7 | 66.7 | 69.5 | 70.0 | 189 | 197 | 198 |
| | Fruits | 2.5 | 3.9 | 4.3 | 4.0 | 5.1 | 5.8 | 5.5 | 203 | 229 | 219 |
| Low- and middle-income countries | All | 1 102.1 | 1 247.6 | 1 305.5 | 1 295.2 | 1 314.1 | 1 389.2 | 1 395.7 | 119 | 126 | 127 |
| | Vegetables | 53.7 | 61.2 | 66.8 | 62.8 | 62.5 | 70.8 | 67.5 | 116 | 132 | 126 |
| | Rice | 158.5 | 170.0 | 176.0 | 173.1 | 172.1 | 179.1 | 178.2 | 109 | 113 | 112 |
| | Fruits | 31.6 | 35.4 | 37.9 | 36.1 | 35.8 | 39.0 | 37.9 | 113 | 123 | 120 |
| | Maize | 136.9 | 166.2 | 170.1 | 174.4 | 184.1 | 190.6 | 192.8 | 134 | 139 | 141 |
| | Wheat | 152.9 | 163.5 | 169.1 | 169.1 | 163.6 | 167.4 | 171.3 | 107 | 109 | 112 |
| Low- and middle-income countries (excluding China) | All | 926.5 | 1 056.8 | 1 107.5 | 1 099.9 | 1 133.5 | 1 197.6 | 1 205.3 | 122 | 129 | 130 |
| | Rice | 128.2 | 135.0 | 142.4 | 138.2 | 136.8 | 146.2 | 142.4 | 107 | 114 | 111 |
| | Vegetables | 29.6 | 36.7 | 39.6 | 37.4 | 41.3 | 45.7 | 44.2 | 140 | 155 | 150 |
| | Fruits | 21.6 | 25.5 | 26.9 | 25.9 | 27.5 | 29.0 | 28.9 | 127 | 134 | 134 |
| | Maize | 101.9 | 127.5 | 131.5 | 134.8 | 147.4 | 153.7 | 155.0 | 145 | 151 | 152 |
| | Wheat | 128.8 | 137.2 | 142.1 | 142.0 | 138.2 | 141.5 | 144.7 | 107 | 110 | 112 |
| World | All | 1 344.2 | 1 515.5 | 1 592.4 | 1 589.2 | 1 582.1 | 1 678.9 | 1 696.6 | 118 | 125 | 126 |
| | Vegetables | 58.4 | 66.8 | 72.8 | 68.8 | 68.2 | 77.0 | 74.0 | 117 | 132 | 127 |
| | Rice | 163.0 | 175.1 | 181.1 | 178.9 | 177.3 | 184.0 | 184.5 | 109 | 113 | 113 |
| | Fruits | 38.8 | 43.7 | 46.8 | 44.8 | 44.1 | 48.2 | 47.1 | 114 | 124 | 121 |
| | Maize | 180.2 | 216.3 | 222.7 | 232.1 | 235.4 | 245.0 | 251.7 | 131 | 136 | 140 |
| | Wheat | 218.9 | 232.6 | 244.9 | 245.5 | 230.8 | 241.3 | 247.7 | 105 | 110 | 113 |

Table S 2.6 Harvested area by region: total and top-five crops by production system (continued)

| OF WHICH: IRRIGATED | | million hectares | | | | | | | index, 2012 = 100 | | |
|---|----------------|------------------|-------|-------|-------|-------|-------|-------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| REGIONS | CROPS | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | All | 47.6 | 58.8 | 56.1 | 67.3 | 63.8 | 58.2 | 76.0 | 134 | 122 | 160 |
| | Vegetables | 1.8 | 2.3 | 2.2 | 2.6 | 2.5 | 2.3 | 3.0 | 143 | 132 | 173 |
| | Maize | 13.7 | 17.5 | 16.8 | 20.7 | 19.4 | 18.0 | 23.6 | 142 | 132 | 172 |
| | Fruits | 1.9 | 2.5 | 2.3 | 2.8 | 2.8 | 2.4 | 3.2 | 143 | 124 | 166 |
| | Wheat | 14.2 | 17.0 | 16.3 | 19.3 | 18.0 | 16.4 | 21.3 | 127 | 116 | 150 |
| | Soybeans | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 116 | 104 | 136 |
| East Asia and Pacific | All | 141.7 | 168.0 | 165.2 | 164.9 | 174.6 | 171.4 | 172.8 | 123 | 121 | 122 |
| | Vegetables | 10.7 | 13.0 | 12.7 | 12.6 | 13.2 | 12.8 | 13.2 | 123 | 119 | 123 |
| | Rice | 54.4 | 61.9 | 62.4 | 60.7 | 62.9 | 64.4 | 62.0 | 116 | 118 | 114 |
| | Fruits | 3.5 | 4.2 | 4.0 | 4.1 | 4.2 | 4.0 | 4.2 | 123 | 117 | 121 |
| | Maize | 24.7 | 30.0 | 28.3 | 29.6 | 30.7 | 28.4 | 30.4 | 124 | 115 | 123 |
| | Sugar cane | 3.5 | 4.3 | 4.3 | 4.2 | 4.7 | 4.7 | 4.6 | 133 | 132 | 132 |
| China | All | 102.8 | 124.2 | 118.5 | 122.8 | 129.0 | 119.5 | 129.6 | 126 | 116 | 126 |
| | Vegetables | 9.7 | 11.8 | 11.4 | 11.5 | 12.0 | 11.3 | 12.1 | 123 | 117 | 124 |
| | Fruits | 3.1 | 3.8 | 3.6 | 3.7 | 3.8 | 3.6 | 3.8 | 123 | 115 | 123 |
| | Rice | 30.2 | 35.1 | 33.7 | 34.9 | 35.3 | 32.8 | 35.8 | 117 | 109 | 118 |
| | Maize | 23.4 | 28.5 | 26.7 | 28.2 | 29.1 | 26.5 | 28.9 | 124 | 113 | 123 |
| | Wheat | 18.3 | 21.5 | 20.9 | 21.5 | 21.9 | 20.7 | 22.3 | 119 | 113 | 122 |
| East Asia and Pacific (excluding China) | All | 39.0 | 43.9 | 46.7 | 42.1 | 45.5 | 51.9 | 43.2 | 117 | 133 | 111 |
| | Rice | 24.2 | 26.9 | 28.7 | 25.8 | 27.6 | 31.6 | 26.2 | 114 | 131 | 109 |
| | Vegetables | 1.0 | 1.2 | 1.3 | 1.1 | 1.2 | 1.5 | 1.2 | 120 | 139 | 112 |
| | Natural rubber | 7.7 | 8.8 | 9.4 | 8.5 | 9.4 | 10.6 | 9.1 | 123 | 137 | 119 |
| | Sugar cane | 1.9 | 2.1 | 2.2 | 2.0 | 2.2 | 2.3 | 2.0 | 117 | 124 | 106 |
| South Asia | All | 137.7 | 153.5 | 143.1 | 147.9 | 158.2 | 137.9 | 150.5 | 115 | 100 | 109 |
| | Rice | 44.7 | 47.6 | 46.8 | 46.9 | 48.0 | 45.6 | 47.2 | 107 | 102 | 106 |
| | Wheat | 34.6 | 38.1 | 35.1 | 36.8 | 38.6 | 32.6 | 36.7 | 112 | 94 | 106 |
| | Vegetables | 4.8 | 6.2 | 5.6 | 5.8 | 7.2 | 6.0 | 6.6 | 151 | 126 | 138 |
| | Fruits | 3.7 | 4.8 | 4.2 | 4.4 | 5.5 | 4.5 | 5.0 | 150 | 122 | 136 |
| | Cotton | 10.1 | 11.0 | 10.1 | 10.6 | 11.2 | 9.5 | 10.6 | 110 | 94 | 105 |
| Europe and Central Asia | All | 23.6 | 27.3 | 27.9 | 27.3 | 27.5 | 29.2 | 28.2 | 116 | 124 | 119 |
| | Vegetables | 1.2 | 1.4 | 1.5 | 1.4 | 1.4 | 1.5 | 1.5 | 121 | 126 | 125 |
| | Wheat | 8.5 | 9.7 | 9.9 | 9.7 | 9.7 | 10.1 | 9.9 | 114 | 120 | 117 |
| | Potatoes | 1.0 | 1.1 | 1.2 | 1.1 | 1.2 | 1.3 | 1.2 | 124 | 133 | 128 |
| | Fruits | 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 115 | 112 | 115 |
| | Maize | 2.6 | 3.1 | 3.2 | 3.2 | 3.1 | 3.6 | 3.4 | 119 | 135 | 129 |

Table S 2.6 Harvested area by region: total and top-five crops by production system (continued)

| OF WHICH: IRRIGATED | | million hectares | | | | | | | index, 2012 = 100 | | |
|--|-------------|------------------|-------|-------|-------|-------|-------|-------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| REGIONS | CROPS | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | All | 25.5 | 32.6 | 34.4 | 31.2 | 37.2 | 41.9 | 35.3 | 146 | 165 | 139 |
| | Soybeans | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 131 | 122 | 119 |
| | Sugar cane | 6.5 | 7.9 | 8.3 | 7.4 | 8.5 | 9.5 | 7.7 | 130 | 147 | 118 |
| | Maize | 4.6 | 6.3 | 6.6 | 6.1 | 7.7 | 8.5 | 7.3 | 168 | 187 | 159 |
| | Fruits | 0.7 | 0.9 | 0.9 | 0.8 | 1.0 | 1.1 | 0.9 | 134 | 147 | 127 |
| | Vegetables | 1.1 | 1.4 | 1.4 | 1.3 | 1.5 | 1.7 | 1.4 | 134 | 150 | 129 |
| Near East and North Africa | All | 20.9 | 21.6 | 19.9 | 21.4 | 19.8 | 16.5 | 20.0 | 95 | 79 | 96 |
| | Vegetables | 2.0 | 2.1 | 2.0 | 2.0 | 1.9 | 1.7 | 1.9 | 97 | 84 | 99 |
| | Fruits | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.7 | 0.8 | 96 | 83 | 98 |
| | Wheat | 9.1 | 9.3 | 8.6 | 9.3 | 8.5 | 7.1 | 8.6 | 94 | 78 | 94 |
| | Other crops | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 89 | 74 | 91 |
| | Potatoes | 0.7 | 0.7 | 0.6 | 0.7 | 0.7 | 0.5 | 0.6 | 99 | 80 | 99 |
| Sub-Saharan Africa | All | 9.3 | 13.2 | 14.7 | 12.8 | 16.8 | 20.6 | 16.3 | 182 | 222 | 176 |
| | Cassava | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 126 | 165 | 114 |
| | Yams | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 123 | 149 | 113 |
| | Vegetables | 0.7 | 1.1 | 1.3 | 1.1 | 1.6 | 2.2 | 1.6 | 247 | 334 | 240 |
| | Maize | 1.0 | 1.7 | 1.6 | 1.6 | 2.3 | 2.2 | 2.2 | 225 | 214 | 214 |
| | Fruits | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 244 | 283 | 229 |
| Low- and middle-income countries | All | 358.7 | 416.3 | 405.3 | 405.5 | 434.0 | 417.4 | 423.0 | 121 | 116 | 118 |
| | Vegetables | 20.4 | 25.2 | 24.4 | 24.3 | 26.9 | 25.8 | 26.3 | 131 | 126 | 128 |
| | Rice | 107.4 | 120.5 | 121.4 | 118.4 | 124.0 | 126.0 | 122.2 | 115 | 117 | 114 |
| | Fruits | 9.6 | 11.8 | 11.1 | 11.3 | 12.7 | 11.5 | 12.1 | 132 | 119 | 126 |
| | Maize | 39.4 | 48.2 | 46.2 | 47.5 | 51.0 | 48.6 | 50.0 | 129 | 123 | 127 |
| | Wheat | 72.8 | 81.8 | 77.9 | 80.5 | 82.5 | 75.1 | 81.4 | 113 | 103 | 112 |
| Low- and middle-income countries (excluding China) | All | 255.9 | 292.1 | 286.8 | 282.7 | 305.0 | 297.9 | 293.4 | 119 | 116 | 115 |
| | Rice | 77.2 | 85.4 | 87.7 | 83.5 | 88.7 | 93.2 | 86.5 | 115 | 121 | 112 |
| | Vegetables | 10.7 | 13.4 | 13.1 | 12.8 | 14.9 | 14.5 | 14.2 | 139 | 135 | 132 |
| | Fruits | 6.5 | 8.1 | 7.5 | 7.6 | 8.9 | 7.9 | 8.3 | 136 | 121 | 128 |
| | Maize | 15.9 | 19.7 | 19.5 | 19.3 | 21.8 | 22.1 | 21.1 | 137 | 138 | 132 |
| | Wheat | 54.5 | 60.3 | 57.0 | 58.9 | 60.7 | 54.4 | 59.1 | 111 | 100 | 108 |
| World | All | 406.3 | 475.1 | 461.4 | 472.9 | 497.8 | 475.6 | 499.0 | 123 | 117 | 123 |
| | Vegetables | 22.2 | 27.4 | 26.6 | 26.9 | 29.4 | 28.1 | 29.3 | 132 | 127 | 132 |
| | Rice | 111.7 | 125.3 | 126.2 | 124.0 | 129.0 | 130.7 | 128.3 | 116 | 117 | 115 |
| | Fruits | 11.6 | 14.3 | 13.4 | 14.1 | 15.5 | 13.9 | 15.3 | 134 | 120 | 133 |
| | Maize | 53.1 | 65.7 | 62.9 | 68.2 | 70.4 | 66.6 | 73.6 | 133 | 125 | 139 |
| | Wheat | 87.0 | 98.7 | 94.2 | 99.8 | 100.5 | 91.5 | 102.7 | 115 | 105 | 118 |

Table S 2.6 Harvested area by region: total and top-five crops by production system (continued)

| OF WHICH: RAINFED | | million hectares | | | | | | | index, 2012 = 100 | | |
|---|------------|------------------|-------|-------|-------|-------|-------|-------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| REGIONS | CROPS | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | All | 194.6 | 209.0 | 230.9 | 226.6 | 204.2 | 231.5 | 224.9 | 105 | 119 | 116 |
| | Vegetables | 3.0 | 3.3 | 3.8 | 3.4 | 3.2 | 3.9 | 3.4 | 107 | 131 | 115 |
| | Maize | 29.6 | 32.6 | 35.8 | 36.9 | 31.9 | 36.4 | 35.4 | 108 | 123 | 119 |
| | Fruits | 5.2 | 5.8 | 6.6 | 6.0 | 5.6 | 6.8 | 6.0 | 106 | 130 | 115 |
| | Wheat | 51.8 | 52.1 | 59.5 | 57.1 | 49.2 | 57.4 | 55.1 | 95 | 111 | 106 |
| | Soybeans | 34.2 | 39.5 | 42.2 | 42.3 | 39.5 | 43.1 | 43.2 | 115 | 126 | 126 |
| East Asia and Pacific | All | 157.2 | 154.6 | 171.4 | 165.4 | 138.7 | 162.4 | 156.9 | 88 | 103 | 100 |
| | Vegetables | 17.5 | 15.9 | 19.2 | 17.2 | 12.3 | 17.0 | 14.6 | 70 | 97 | 83 |
| | Rice | 26.0 | 24.5 | 26.0 | 26.4 | 22.9 | 23.9 | 25.7 | 88 | 92 | 99 |
| | Fruits | 10.1 | 9.4 | 10.9 | 9.9 | 7.6 | 9.7 | 8.6 | 75 | 96 | 86 |
| | Maize | 20.4 | 19.3 | 21.1 | 21.0 | 16.3 | 19.0 | 18.1 | 80 | 93 | 89 |
| | Sugar cane | 1.0 | 1.0 | 1.0 | 1.0 | 0.9 | 0.9 | 1.0 | 91 | 94 | 97 |
| China | All | 72.9 | 66.7 | 79.4 | 72.5 | 51.5 | 72.1 | 60.9 | 71 | 99 | 84 |
| | Vegetables | 14.5 | 12.8 | 15.9 | 13.9 | 9.3 | 13.8 | 11.2 | 64 | 95 | 78 |
| | Fruits | 6.9 | 6.1 | 7.4 | 6.5 | 4.4 | 6.4 | 5.2 | 64 | 92 | 76 |
| | Maize | 11.6 | 10.3 | 12.0 | 11.4 | 7.6 | 10.4 | 8.8 | 65 | 90 | 76 |
| | Wheat | 5.8 | 4.8 | 6.1 | 5.5 | 3.5 | 5.2 | 4.3 | 60 | 90 | 74 |
| East Asia and Pacific (excluding China) | All | 84.3 | 87.9 | 91.9 | 92.8 | 87.2 | 90.2 | 96.0 | 103 | 107 | 114 |
| | Rice | 26.0 | 24.5 | 26.0 | 26.4 | 22.9 | 23.9 | 25.7 | 88 | 92 | 99 |
| | Palm oil | 11.9 | 14.7 | 15.7 | 15.2 | 15.7 | 16.9 | 17.4 | 132 | 142 | 147 |
| | Vegetables | 3.1 | 3.1 | 3.4 | 3.3 | 3.0 | 3.2 | 3.4 | 98 | 106 | 111 |
| | Sugar cane | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 93 | 91 | 95 |
| South Asia | All | 104.1 | 107.1 | 119.9 | 116.1 | 103.9 | 123.0 | 118.6 | 100 | 118 | 114 |
| | Rice | 16.0 | 14.1 | 16.6 | 16.2 | 12.7 | 15.4 | 15.7 | 79 | 96 | 98 |
| | Wheat | 7.3 | 7.3 | 7.8 | 7.6 | 6.7 | 7.5 | 7.2 | 92 | 103 | 98 |
| | Vegetables | 4.7 | 5.5 | 6.4 | 5.9 | 5.8 | 7.2 | 6.8 | 125 | 155 | 146 |
| | Fruits | 2.5 | 2.9 | 3.3 | 3.1 | 3.1 | 3.7 | 3.5 | 125 | 148 | 142 |
| | Cotton | 4.7 | 4.6 | 5.3 | 4.9 | 4.3 | 5.5 | 4.9 | 91 | 116 | 103 |
| Europe and Central Asia | All | 122.8 | 129.2 | 140.5 | 138.6 | 129.9 | 142.8 | 142.2 | 106 | 116 | 116 |
| | Vegetables | 2.9 | 3.2 | 3.6 | 3.4 | 3.2 | 3.8 | 3.6 | 110 | 132 | 126 |
| | Wheat | 51.1 | 52.1 | 58.0 | 56.6 | 51.9 | 58.4 | 57.6 | 102 | 114 | 113 |
| | Potatoes | 4.1 | 4.5 | 4.7 | 4.8 | 4.7 | 4.9 | 5.1 | 116 | 122 | 126 |
| | Fruits | 3.1 | 3.4 | 3.8 | 3.5 | 3.4 | 3.9 | 3.7 | 110 | 128 | 122 |
| | Maize | 9.6 | 10.8 | 11.2 | 11.6 | 11.1 | 11.7 | 11.9 | 116 | 122 | 123 |

Table S.2.6 Harvested area by region: total and top-five crops by production system (continued)

| OF WHICH: RAINFED | | million hectares | | | | | | | index, 2012 = 100 | | |
|--|-------------|------------------|---------|---------|---------|---------|---------|---------|-------------------|-----|-----|
| | | 2012 | 2030 | | | 2050 | | | 2050 | | |
| REGIONS | CROPS | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| Latin America and Caribbean | All | 125.3 | 137.1 | 145.0 | 147.8 | 143.5 | 151.7 | 159.5 | 115 | 121 | 127 |
| | Soybeans | 48.5 | 52.2 | 54.5 | 56.0 | 52.5 | 54.8 | 57.9 | 108 | 113 | 119 |
| | Sugar cane | 6.5 | 6.6 | 6.5 | 6.6 | 6.3 | 6.2 | 6.4 | 97 | 95 | 97 |
| | Maize | 26.5 | 30.9 | 32.4 | 33.8 | 34.7 | 36.5 | 37.7 | 131 | 137 | 142 |
| | Fruits | 2.2 | 2.3 | 2.6 | 2.4 | 2.3 | 2.6 | 2.6 | 104 | 118 | 117 |
| | Vegetables | 1.5 | 1.6 | 1.7 | 1.6 | 1.5 | 1.7 | 1.7 | 100 | 111 | 113 |
| Near East and North Africa | All | 23.5 | 23.9 | 25.8 | 25.1 | 23.5 | 25.6 | 25.4 | 100 | 109 | 108 |
| | Vegetables | 1.0 | 1.0 | 1.1 | 1.0 | 1.0 | 1.1 | 1.0 | 101 | 111 | 108 |
| | Fruits | 1.8 | 1.9 | 2.1 | 1.9 | 1.8 | 2.1 | 2.0 | 104 | 119 | 113 |
| | Wheat | 7.7 | 7.6 | 8.2 | 8.0 | 7.4 | 8.1 | 7.9 | 96 | 105 | 104 |
| | Other crops | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 99 | 99 | 99 |
| | Potatoes | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 105 | 112 | 115 |
| Sub-Saharan Africa | All | 210.5 | 279.4 | 297.6 | 296.8 | 340.4 | 366.3 | 370.1 | 162 | 174 | 176 |
| | Cassava | 15.9 | 18.8 | 19.3 | 20.1 | 21.2 | 21.4 | 23.2 | 133 | 134 | 145 |
| | Yams | 10.3 | 11.9 | 12.2 | 12.6 | 13.1 | 13.3 | 14.1 | 128 | 129 | 137 |
| | Vegetables | 5.8 | 8.9 | 10.3 | 9.5 | 11.9 | 14.2 | 13.5 | 206 | 247 | 234 |
| | Maize | 34.3 | 50.1 | 51.9 | 53.1 | 64.4 | 67.3 | 67.8 | 188 | 196 | 198 |
| | Fruits | 2.4 | 3.7 | 4.1 | 3.9 | 4.9 | 5.5 | 5.3 | 201 | 227 | 219 |
| Low- and middle-income countries | All | 743.4 | 831.3 | 900.2 | 889.7 | 880.0 | 971.8 | 972.7 | 118 | 131 | 131 |
| | Vegetables | 33.3 | 36.0 | 42.4 | 38.5 | 35.7 | 45.0 | 41.2 | 107 | 135 | 124 |
| | Rice | 51.1 | 49.5 | 54.6 | 54.7 | 48.1 | 53.1 | 56.0 | 94 | 104 | 110 |
| | Fruits | 22.0 | 23.6 | 26.7 | 24.8 | 23.0 | 27.5 | 25.8 | 105 | 125 | 117 |
| | Maize | 97.5 | 118.0 | 124.0 | 126.9 | 133.1 | 142.0 | 142.8 | 137 | 146 | 146 |
| | Wheat | 80.1 | 81.8 | 91.2 | 88.6 | 81.1 | 92.3 | 90.0 | 101 | 115 | 112 |
| Low- and middle-income countries (excluding China) | All | 670.5 | 764.6 | 820.8 | 817.2 | 828.5 | 899.6 | 911.8 | 124 | 134 | 136 |
| | Rice | 51.1 | 49.5 | 54.6 | 54.7 | 48.1 | 53.1 | 56.0 | 94 | 104 | 110 |
| | Vegetables | 18.8 | 23.2 | 26.5 | 24.6 | 26.4 | 31.2 | 30.0 | 140 | 166 | 159 |
| | Fruits | 15.1 | 17.5 | 19.4 | 18.3 | 18.6 | 21.2 | 20.6 | 123 | 140 | 136 |
| | Maize | 85.9 | 107.7 | 112.0 | 115.5 | 125.5 | 131.6 | 133.9 | 146 | 153 | 156 |
| | Wheat | 74.2 | 76.9 | 85.1 | 83.1 | 77.5 | 87.1 | 85.7 | 104 | 117 | 115 |
| World | All | 938.0 | 1 040.3 | 1 131.1 | 1 116.3 | 1 084.3 | 1 203.2 | 1 197.6 | 116 | 128 | 128 |
| | Vegetables | 36.2 | 39.3 | 46.1 | 41.9 | 38.8 | 48.9 | 44.6 | 107 | 135 | 123 |
| | Rice | 51.3 | 49.7 | 54.9 | 54.9 | 48.3 | 53.3 | 56.1 | 94 | 104 | 109 |
| | Fruits | 27.3 | 29.3 | 33.3 | 30.8 | 28.6 | 34.3 | 31.8 | 105 | 126 | 117 |
| | Maize | 127.1 | 150.6 | 159.8 | 163.9 | 165.0 | 178.4 | 178.1 | 130 | 140 | 140 |
| | Wheat | 131.9 | 133.9 | 150.7 | 145.7 | 130.3 | 149.8 | 145.1 | 99 | 114 | 110 |

Note: Crops are ranked according to their value expressed as physical output at the base year times base-year prices in USD. The selection of the top-five crops is based on their total harvested area, that is both under irrigated and rainfed production systems. The table also reports how much of the total harvested area was under irrigated and rainfed production systems respectively.

Source: FAO Global Perspectives Studies, based on simulations with the GAPS model.

Table S 2.7 Large ruminants, standing herd size and growth rates

a) Levels

| REGIONS | million heads | | | | | | | | | index, 2012 = 100 | | |
|--|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------|------------|------------|
| | 1970 | 2002 | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | HISTORICAL | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | 277 | 266 | 256 | 255 | 234 | 264 | 250 | 206 | 236 | 98 | 80 | 92 |
| East Asia and Pacific | 119 | 178 | 204 | 233 | 216 | 249 | 254 | 225 | 247 | 125 | 110 | 121 |
| – China | 73 | 121 | 137 | 149 | 137 | 160 | 146 | 125 | 141 | 106 | 91 | 103 |
| – East Asia and Pacific (excluding China) | 46 | 57 | 67 | 84 | 79 | 90 | 108 | 100 | 106 | 162 | 150 | 158 |
| South Asia | 298 | 370 | 413 | 490 | 447 | 453 | 474 | 428 | 473 | 115 | 103 | 114 |
| Europe and Central Asia | 21 | 74 | 73 | 102 | 93 | 112 | 119 | 105 | 117 | 162 | 144 | 159 |
| Latin America and Caribbean | 207 | 357 | 391 | 481 | 453 | 503 | 546 | 479 | 540 | 140 | 123 | 138 |
| Near East and North Africa | 19 | 25 | 30 | 35 | 33 | 36 | 46 | 42 | 44 | 156 | 143 | 149 |
| Sub-Saharan Africa | 103 | 187 | 290 | 487 | 462 | 514 | 683 | 666 | 638 | 236 | 230 | 220 |
| Low- and middle-income countries | 766 | 1191 | 1401 | 1830 | 1704 | 1867 | 2122 | 1947 | 2060 | 151 | 139 | 147 |
| – Low- and middle-income countries (excluding China) | 693 | 1070 | 1264 | 1681 | 1567 | 1707 | 1976 | 1822 | 1918 | 156 | 144 | 152 |
| World | 1043 | 1457 | 1657 | 2085 | 1938 | 2131 | 2372 | 2153 | 2296 | 143 | 130 | 139 |

b) Growth rate

| REGIONS | percent | | | | | | | | | | | |
|--|-------------|-------------|-------------|------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | 1970–2012 | 1970–2002 | 2003–2012 | 2012–2030 | | | 2031–2050 | | | 2012–2050 | | |
| | HISTORICAL | | | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | -0.2 | -0.1 | -0.4 | 0.0 | -0.5 | 0.2 | -0.1 | -0.6 | -0.6 | -0.1 | -0.6 | -0.2 |
| East Asia and Pacific | 1.3 | 1.3 | 1.4 | 0.7 | 0.3 | 1.1 | 0.4 | 0.2 | 0.0 | 0.6 | 0.3 | 0.5 |
| – China | 1.5 | 1.6 | 1.3 | 0.5 | 0.0 | 0.8 | -0.1 | -0.4 | -0.6 | 0.2 | -0.2 | 0.1 |
| – East Asia and Pacific (excluding China) | 0.9 | 0.7 | 1.6 | 1.3 | 0.9 | 1.6 | 1.3 | 1.2 | 0.8 | 1.3 | 1.1 | 1.2 |
| South Asia | 0.8 | 0.7 | 1.1 | 1.0 | 0.4 | 0.5 | -0.2 | -0.2 | 0.2 | 0.4 | 0.1 | 0.4 |
| Europe and Central Asia | 3.0 | 4.0 | -0.1 | 1.9 | 1.3 | 2.4 | 0.8 | 0.6 | 0.2 | 1.3 | 1.0 | 1.2 |
| Latin America and Caribbean | 1.5 | 1.7 | 0.9 | 1.2 | 0.8 | 1.4 | 0.6 | 0.3 | 0.4 | 0.9 | 0.5 | 0.9 |
| Near East and North Africa | 1.1 | 0.9 | 1.8 | 1.0 | 0.7 | 1.1 | 1.4 | 1.2 | 1.0 | 1.2 | 0.9 | 1.1 |
| Sub-Saharan Africa | 2.5 | 1.9 | 4.5 | 2.9 | 2.6 | 3.2 | 1.7 | 1.8 | 1.1 | 2.3 | 2.2 | 2.1 |
| Low- and middle-income countries | 1.4 | 1.4 | 1.6 | 1.5 | 1.1 | 1.6 | 0.7 | 0.7 | 0.5 | 1.1 | 0.9 | 1.0 |
| – Low- and middle-income countries (excluding China) | 1.4 | 1.4 | 1.7 | 1.6 | 1.2 | 1.7 | 0.8 | 0.8 | 0.6 | 1.2 | 1.0 | 1.1 |
| World | 1.1 | 1.1 | 1.3 | 1.3 | 0.9 | 1.4 | 0.6 | 0.5 | 0.4 | 0.9 | 0.7 | 0.9 |

Sources: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Table S 2.8 Small ruminants, standing herd size and growth rates**a) Levels**

| REGIONS | million heads | | | | | | | | | index, 2012 = 100 | | |
|--|---------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------|------------|------------|
| | 1970 | 2002 | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | HISTORICAL | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | 398 | 312 | 255 | 270 | 235 | 298 | 297 | 244 | 291 | 116 | 95 | 114 |
| East Asia and Pacific | 170 | 353 | 450 | 505 | 449 | 559 | 513 | 441 | 508 | 114 | 98 | 113 |
| – China | 140 | 298 | 366 | 405 | 358 | 451 | 399 | 337 | 393 | 109 | 92 | 107 |
| – East Asia and Pacific (excluding China) | 29 | 55 | 83 | 100 | 92 | 108 | 114 | 104 | 115 | 137 | 125 | 138 |
| South Asia | 173 | 322 | 381 | 504 | 477 | 515 | 571 | 534 | 560 | 150 | 140 | 147 |
| Europe and Central Asia | 83 | 112 | 150 | 168 | 149 | 185 | 181 | 157 | 178 | 121 | 105 | 118 |
| Latin America and Caribbean | 125 | 96 | 100 | 123 | 105 | 140 | 137 | 115 | 134 | 137 | 115 | 135 |
| Near East and North Africa | 120 | 182 | 208 | 244 | 221 | 255 | 284 | 246 | 270 | 137 | 118 | 130 |
| Sub-Saharan Africa | 165 | 358 | 593 | 1048 | 954 | 1144 | 1485 | 1364 | 1423 | 250 | 230 | 240 |
| Low- and middle-income countries | 836 | 1422 | 1881 | 2591 | 2356 | 2798 | 3172 | 2856 | 3072 | 169 | 152 | 163 |
| – Low- and middle-income countries (excluding China) | 696 | 1124 | 1515 | 2186 | 1998 | 2347 | 2773 | 2518 | 2680 | 183 | 166 | 177 |
| World | 1234 | 1734 | 2136 | 2861 | 2591 | 3096 | 3469 | 3099 | 3363 | 162 | 145 | 157 |

b) Growth rate

| REGIONS | percent | | | | | | | | | | | |
|--|-------------|-------------|-------------|------------|-------------|------------|------------|------------|-------------|------------|-------------|------------|
| | 1970–2012 | 1970–2002 | 2003–2012 | 2012–2030 | | | 2031–2050 | | | 2012–2050 | | |
| | HISTORICAL | | | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | -1.1 | -0.8 | -2.0 | 0.3 | -0.5 | 0.9 | 0.5 | 0.2 | -0.1 | 0.4 | -0.1 | 0.3 |
| East Asia and Pacific | 2.3 | 2.3 | 2.5 | 0.6 | 0.0 | 1.2 | 0.1 | -0.1 | -0.5 | 0.3 | 0.0 | 0.3 |
| – China | 2.3 | 2.4 | 2.1 | 0.6 | -0.1 | 1.2 | -0.1 | -0.3 | -0.7 | 0.2 | -0.2 | 0.2 |
| – East Asia and Pacific (excluding China) | 2.5 | 2.0 | 4.3 | 1.0 | 0.5 | 1.4 | 0.7 | 0.6 | 0.3 | 0.8 | 0.6 | 0.8 |
| South Asia | 1.9 | 2.0 | 1.7 | 1.6 | 1.3 | 1.7 | 0.6 | 0.6 | 0.4 | 1.1 | 0.9 | 1.0 |
| Europe and Central Asia | 1.4 | 0.9 | 3.0 | 0.6 | 0.0 | 1.2 | 0.4 | 0.2 | -0.2 | 0.5 | 0.1 | 0.4 |
| Latin America and Caribbean | -0.5 | -0.8 | 0.4 | 1.2 | 0.3 | 1.9 | 0.6 | 0.4 | -0.2 | 0.8 | 0.4 | 0.8 |
| Near East and North Africa | 1.3 | 1.3 | 1.4 | 0.9 | 0.3 | 1.1 | 0.8 | 0.5 | 0.3 | 0.8 | 0.4 | 0.7 |
| Sub-Saharan Africa | 3.1 | 2.4 | 5.2 | 3.2 | 2.7 | 3.7 | 1.8 | 1.8 | 1.1 | 2.4 | 2.2 | 2.3 |
| Low- and middle-income countries | 1.9 | 1.7 | 2.8 | 1.8 | 1.3 | 2.2 | 1.0 | 1.0 | 0.5 | 1.4 | 1.1 | 1.3 |
| – Low- and middle-income countries (excluding China) | 1.9 | 1.5 | 3.0 | 2.1 | 1.6 | 2.5 | 1.2 | 1.2 | 0.7 | 1.6 | 1.3 | 1.5 |
| World | 1.3 | 1.1 | 2.1 | 1.6 | 1.1 | 2.1 | 1.0 | 0.9 | 0.4 | 1.3 | 1.0 | 1.2 |

Sources: FAO Global Perspectives Studies, based on simulations with the FAO GAPIS model.

Table S 2.9 Pigs, standing herd size and growth rates

a) Levels

| REGIONS | million heads | | | | | | | | | index, 2012 = 100 | | |
|--|---------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------|------------|------------|
| | 1970 | 2002 | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | HISTORICAL | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | 190 | 264 | 256 | 273 | 246 | 285 | 290 | 249 | 289 | 113 | 97 | 113 |
| East Asia and Pacific | 205 | 454 | 546 | 626 | 571 | 652 | 628 | 552 | 629 | 115 | 101 | 115 |
| – China | 173 | 390 | 468 | 532 | 484 | 557 | 522 | 456 | 524 | 112 | 97 | 112 |
| – East Asia and Pacific (excluding China) | 32 | 64 | 78 | 94 | 87 | 96 | 105 | 97 | 105 | 134 | 124 | 134 |
| South Asia | 6 | 15 | 12 | 13 | 12 | 14 | 14 | 13 | 14 | 119 | 110 | 120 |
| Europe and Central Asia | 8 | 36 | 41 | 48 | 44 | 50 | 53 | 48 | 53 | 131 | 118 | 130 |
| Latin America and Caribbean | 61 | 69 | 84 | 107 | 97 | 111 | 122 | 108 | 122 | 145 | 128 | 145 |
| Near East and North Africa | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 106 | 106 | 106 |
| Sub-Saharan Africa | 7 | 23 | 33 | 63 | 58 | 67 | 107 | 99 | 106 | 327 | 302 | 323 |
| Low- and middle-income countries | 288 | 597 | 716 | 857 | 783 | 895 | 924 | 821 | 925 | 129 | 115 | 129 |
| – Low- and middle-income countries (excluding China) | 115 | 206 | 248 | 325 | 299 | 338 | 402 | 365 | 401 | 162 | 147 | 162 |
| World | 477 | 860 | 972 | 1130 | 1029 | 1179 | 1214 | 1070 | 1213 | 125 | 110 | 125 |

b) Growth rate

| REGIONS | percent | | | | | | | | | | | |
|--|------------|------------|-------------|------------|-------------|------------|------------|------------|------------|------------|-------------|------------|
| | 1970–2012 | 1970–2002 | 2003–2012 | 2012–2030 | | | 2031–2050 | | | 2012–2050 | | |
| | HISTORICAL | | | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | 0.7 | 1.0 | -0.3 | 0.3 | -0.2 | 0.6 | 0.3 | 0.1 | 0.1 | 0.3 | -0.1 | 0.3 |
| East Asia and Pacific | 2.4 | 2.5 | 1.9 | 0.8 | 0.2 | 1.0 | 0.0 | -0.2 | -0.2 | 0.4 | 0.0 | 0.4 |
| – China | 2.4 | 2.6 | 1.8 | 0.7 | 0.2 | 1.0 | -0.1 | -0.3 | -0.3 | 0.3 | -0.1 | 0.3 |
| – East Asia and Pacific (excluding China) | 2.1 | 2.1 | 2.1 | 1.0 | 0.6 | 1.1 | 0.6 | 0.5 | 0.5 | 0.8 | 0.6 | 0.8 |
| South Asia | 1.4 | 2.6 | -2.3 | 0.6 | 0.1 | 0.9 | 0.3 | 0.4 | 0.1 | 0.5 | 0.2 | 0.5 |
| Europe and Central Asia | 3.9 | 4.8 | 1.2 | 0.9 | 0.4 | 1.2 | 0.5 | 0.4 | 0.3 | 0.7 | 0.4 | 0.7 |
| Latin America and Caribbean | 0.8 | 0.4 | 2.0 | 1.3 | 0.8 | 1.6 | 0.7 | 0.5 | 0.5 | 1.0 | 0.6 | 1.0 |
| Near East and North Africa | -2.5 | -1.3 | -6.3 | 0.3 | 0.3 | 0.2 | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 | 0.2 |
| Sub-Saharan Africa | 3.7 | 3.7 | 3.7 | 3.7 | 3.2 | 4.0 | 2.7 | 2.7 | 2.3 | 3.2 | 3.0 | 3.1 |
| Low- and middle-income countries | 2.2 | 2.3 | 1.8 | 1.0 | 0.5 | 1.2 | 0.4 | 0.2 | 0.2 | 0.7 | 0.4 | 0.7 |
| – Low- and middle-income countries (excluding China) | 1.8 | 1.8 | 1.8 | 1.5 | 1.0 | 1.7 | 1.1 | 1.0 | 0.9 | 1.3 | 1.0 | 1.3 |
| World | 1.7 | 1.9 | 1.2 | 0.8 | 0.3 | 1.1 | 0.4 | 0.2 | 0.1 | 0.6 | 0.3 | 0.6 |

Sources: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

Table S 2.10 Poultry, standing herd size and growth rates**a) Levels**

| REGIONS | million heads | | | | | | | | | index, 2012 = 100 | | |
|--|---------------|------|-----------|------|-----|-----|------|-----|-----|-------------------|-----|-----|
| | 1970 | 2002 | 2012 | 2030 | | | 2050 | | | 2050 | | |
| | HISTORICAL | | BASE YEAR | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | 2 | 5 | 5 | 6 | 6 | 6 | 6 | 5 | 6 | 131 | 113 | 129 |
| East Asia and Pacific | 1 | 7 | 9 | 10 | 10 | 11 | 11 | 10 | 11 | 121 | 110 | 120 |
| – China | 1 | 5 | 6 | 6 | 6 | 7 | 6 | 6 | 6 | 108 | 96 | 106 |
| – East Asia and Pacific (excluding China) | 0 | 2 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 145 | 135 | 146 |
| South Asia | 0 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 164 | 156 | 162 |
| Europe and Central Asia | 0 | 1 | 1 | 2 | 1 | 2 | 2 | 2 | 2 | 140 | 128 | 139 |
| Latin America and Caribbean | 1 | 2 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 135 | 119 | 133 |
| Near East and North Africa | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 131 | 119 | 127 |
| Sub-Saharan Africa | 0 | 1 | 1 | 4 | 3 | 4 | 7 | 7 | 7 | 584 | 553 | 574 |
| Low- and middle-income countries | 2 | 13 | 18 | 23 | 22 | 24 | 29 | 26 | 28 | 161 | 148 | 159 |
| – Low- and middle-income countries (excluding China) | 2 | 8 | 12 | 17 | 16 | 17 | 22 | 21 | 22 | 187 | 173 | 185 |
| World | 5 | 18 | 22 | 29 | 27 | 30 | 35 | 32 | 34 | 155 | 140 | 153 |

b) Growth rate

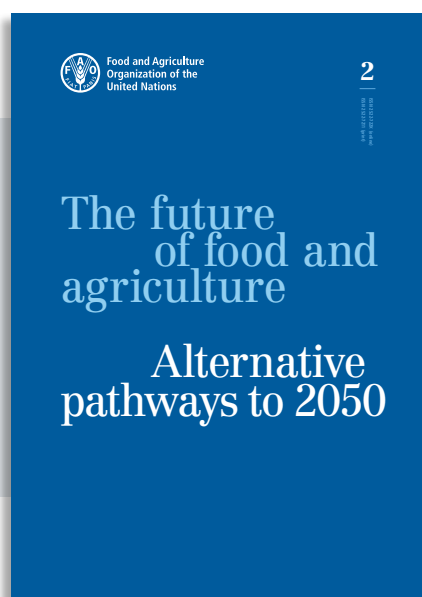
| REGIONS | percent | | | | | | | | | | | |
|--|------------|-----------|-----------|-----------|-----|-----|-----------|------|------|-----------|------|-----|
| | 1970–2012 | 1970–2002 | 2003–2012 | 2012–2030 | | | 2031–2050 | | | 2012–2050 | | |
| | HISTORICAL | | | BAU | TSS | SSS | BAU | TSS | SSS | BAU | TSS | SSS |
| High-income countries | 1.6 | 2.0 | 0.3 | 1.3 | 0.8 | 1.5 | 0.1 | -0.2 | -0.1 | 0.7 | 0.3 | 0.7 |
| East Asia and Pacific | 5.0 | 5.9 | 2.2 | 0.8 | 0.4 | 1.0 | 0.3 | 0.1 | 0.1 | 0.5 | 0.2 | 0.5 |
| – China | 4.9 | 5.9 | 1.7 | 0.5 | 0.1 | 0.8 | -0.1 | -0.3 | -0.4 | 0.2 | -0.1 | 0.2 |
| – East Asia and Pacific (excluding China) | 5.3 | 5.9 | 3.2 | 1.2 | 1.0 | 1.3 | 0.8 | 0.6 | 0.7 | 1.0 | 0.8 | 1.0 |
| South Asia | 4.3 | 3.9 | 5.5 | 1.6 | 1.4 | 1.6 | 1.1 | 1.0 | 1.0 | 1.3 | 1.2 | 1.3 |
| Europe and Central Asia | 5.8 | 6.6 | 3.2 | 1.1 | 0.7 | 1.3 | 0.7 | 0.6 | 0.5 | 0.9 | 0.7 | 0.9 |
| Latin America and Caribbean | 4.3 | 4.6 | 3.1 | 1.0 | 0.5 | 1.3 | 0.6 | 0.4 | 0.3 | 0.8 | 0.5 | 0.8 |
| Near East and North Africa | 5.8 | 5.8 | 6.0 | 0.9 | 0.6 | 1.0 | 0.5 | 0.4 | 0.3 | 0.7 | 0.5 | 0.6 |
| Sub-Saharan Africa | 3.6 | 3.6 | 3.7 | 6.2 | 5.9 | 6.3 | 3.5 | 3.5 | 3.3 | 4.8 | 4.6 | 4.7 |
| Low- and middle-income countries | 4.8 | 5.3 | 3.1 | 1.5 | 1.1 | 1.6 | 1.1 | 0.9 | 0.9 | 1.3 | 1.0 | 1.2 |
| – Low- and middle-income countries (excluding China) | 4.7 | 5.0 | 3.8 | 1.9 | 1.6 | 2.0 | 1.4 | 1.4 | 1.3 | 1.7 | 1.5 | 1.6 |
| World | 3.7 | 4.1 | 2.4 | 1.5 | 1.1 | 1.6 | 0.9 | 0.7 | 0.7 | 1.2 | 0.9 | 1.1 |

Sources: FAO Global Perspectives Studies, based on simulations with the FAO GAPS model.

THE FUTURE OF FOOD AND AGRICULTURE ALTERNATIVE PATHWAYS TO 2050

This report explores three different scenarios for the future of food and agriculture, based on alternative trends for key drivers, including income growth and distribution, population growth, technical progress and climate change. Building on the report *The future of food and agriculture – Trends and challenges*,

this publication forms part of FAO's efforts to support evidence-based decision-making processes. It provides solid qualitative and quantitative analysis and sheds light on possible strategic options to achieve the Sustainable Development Goal of eradicating hunger, improving nutrition and ensuring economic, social and environmental sustainability of food and agricultural systems.



The publication *The future of food and agriculture – Alternative pathways to 2050* is available at:
www.fao.org/3/I8429EN/i8429en.pdf
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